

# KIC 010960995

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010960995-01	OBS	3564.01	1.558548	131.566182	224959.4	3.362	5320.7	2058.4	0.71	4868	42.17	462.76
010960995-02	OBS	No	306.206566	159.988565	2747.1	3.500	12.1	-1.0	0.71	4868	3.59	0.41

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010960995-01	OBS	FP	0.00	0	1	0	0	DEPTH_ODDEVEN_DV—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—CENT_KIC_POS
010960995-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

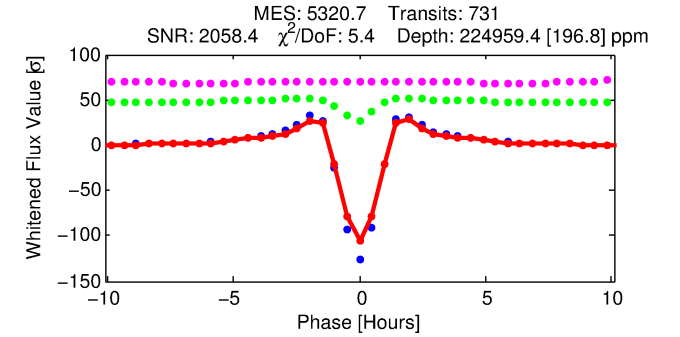
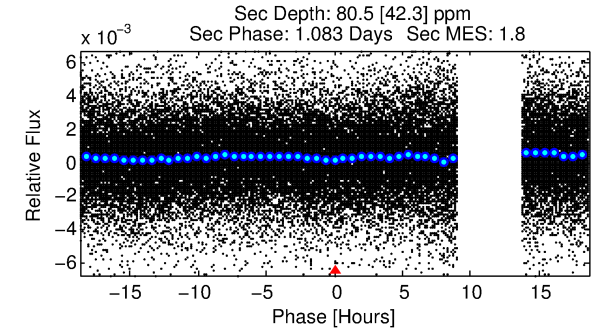
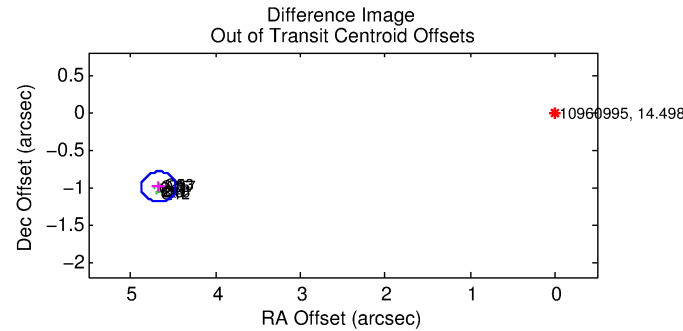
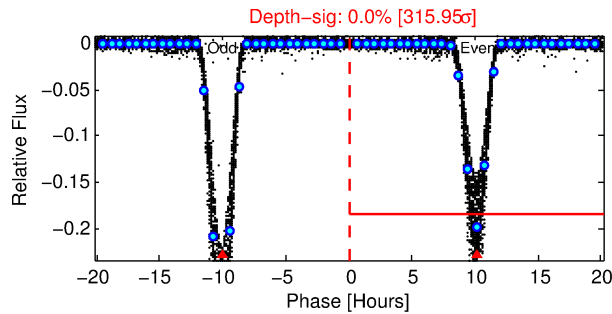
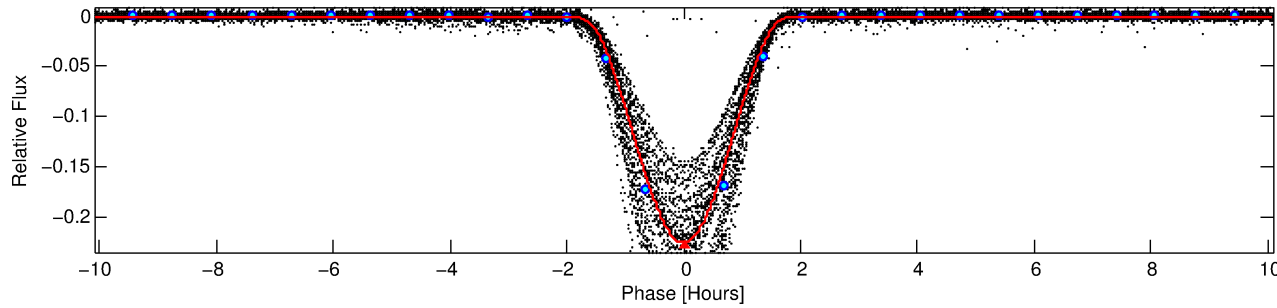
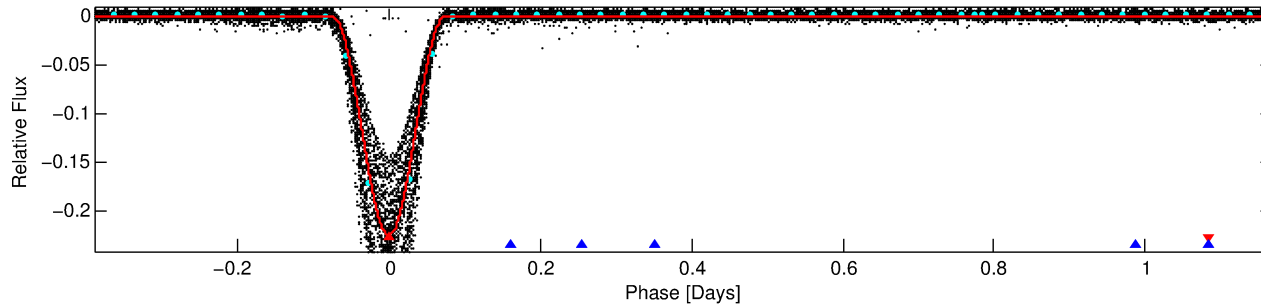
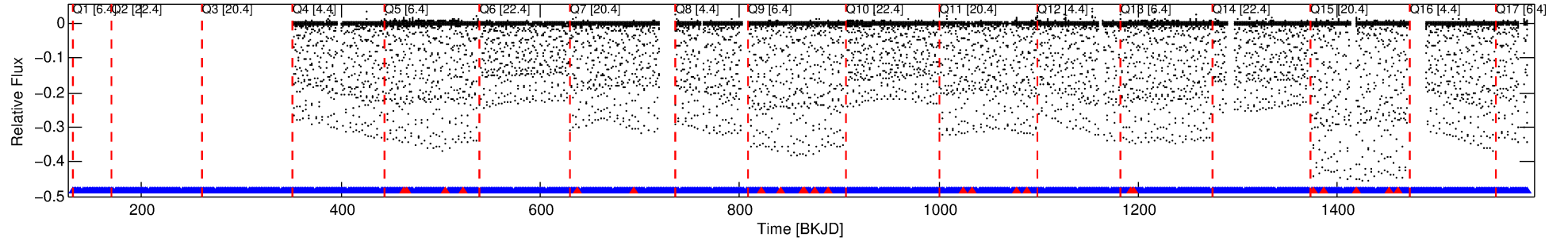
Ephemeris Match Information For 010960995-01

No Significant Match Found

# DV One-Page Summary

KIC: 10960995 Candidate: 1 of 2 Period: 1.559 d  
KOI: K03564.01 Corr: 0.994

Kp: 14.50 R\*: 0.71 Rs Teff: 4868.0 K Logg: 4.58 Fe/H: -0.220



## DV Fit Results:

Period = 1.55855 [0.00000] d  
Epoch = 131.5662 [0.0000] BKJD  
Rp/R\* = 0.5459 [0.0644]  
a/R\* = 4.96 [0.08]  
b = 0.72 [0.10]  
Seff = 462.76 [84.55]  
Teq = 1183 [54] K  
Rp = 42.17 [6.45] Re  
a = 0.0233 [0.0019] AU  
Ag = 0.01 [0.01] [-123.80σ]  
Teffp = 624 [93] K [-5.21σ]

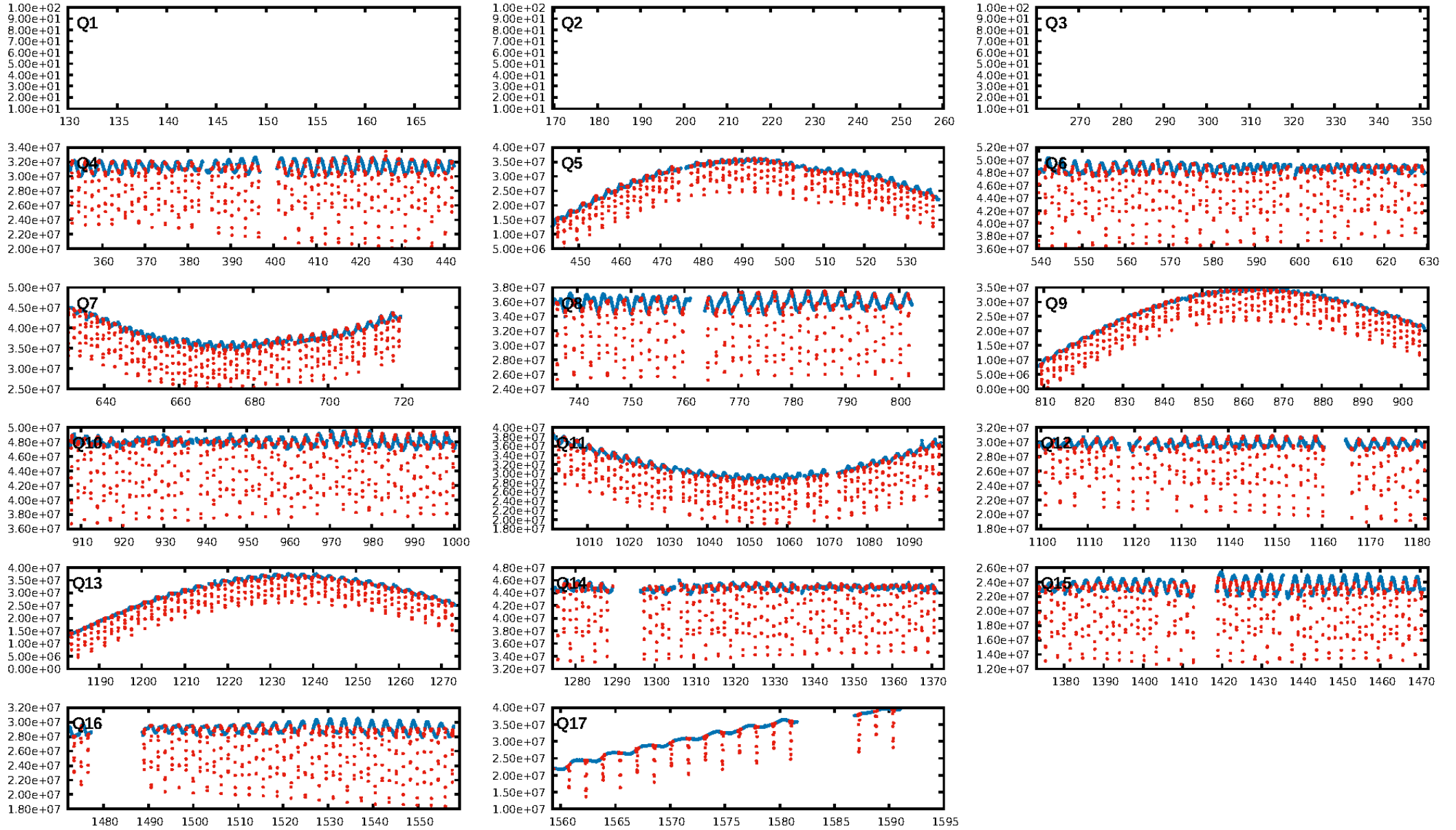
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [1506.62σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.97 [690/713]  
GhostDiagnostic-chr: 1.392  
Centroid-sig: N/A  
Centroid-so: 3.058 arcsec [13721.98σ]  
OotOffset-rm: 4.776 arcsec [70.99σ]  
KicOffset-rm: 0.093 arcsec [1.37σ]  
OotOffset-st: 0/3/4/4 [11]  
KicOffset-st: 3/3/4/4 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

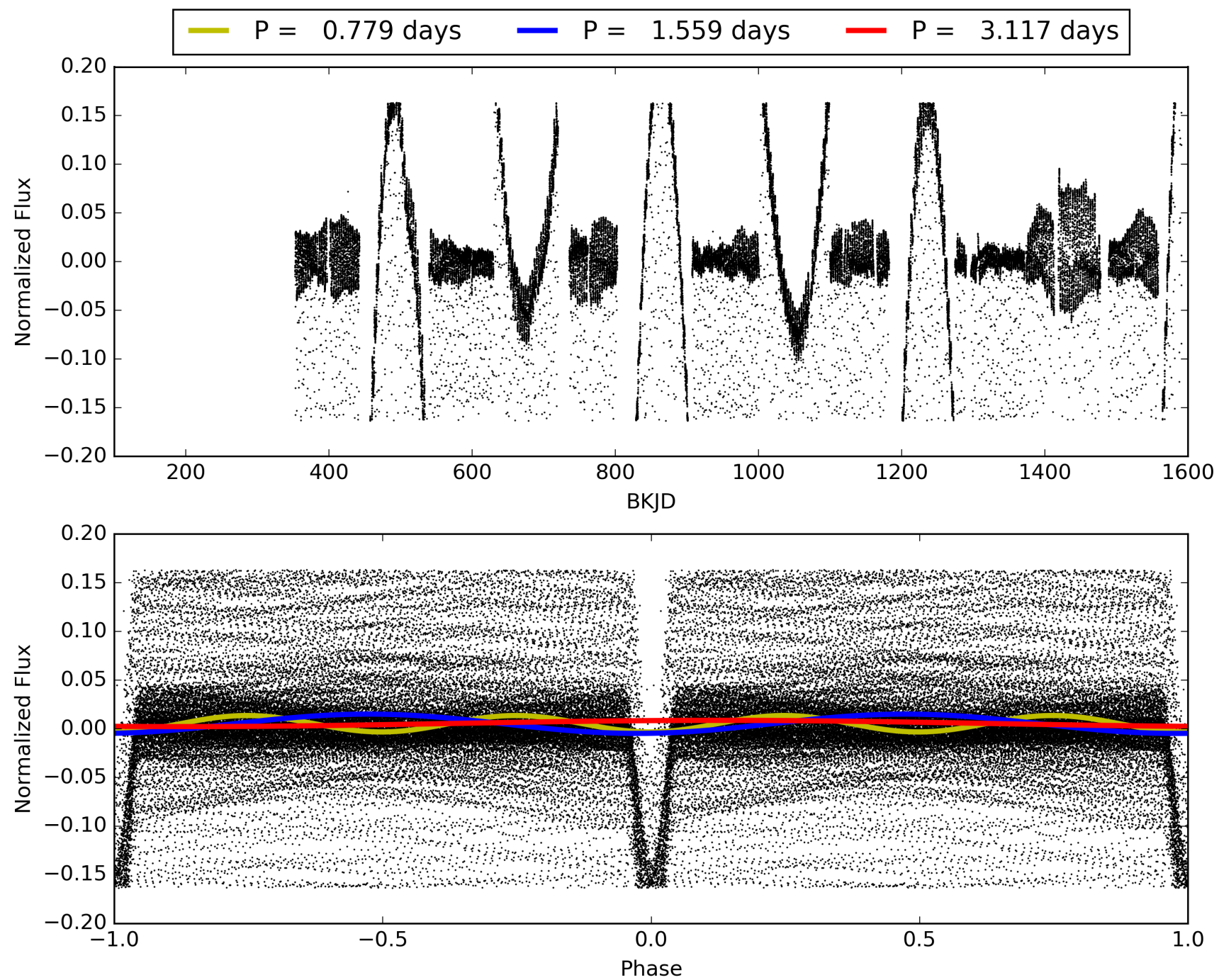
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 10:54:14 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010960995-01, PDC Light Curves

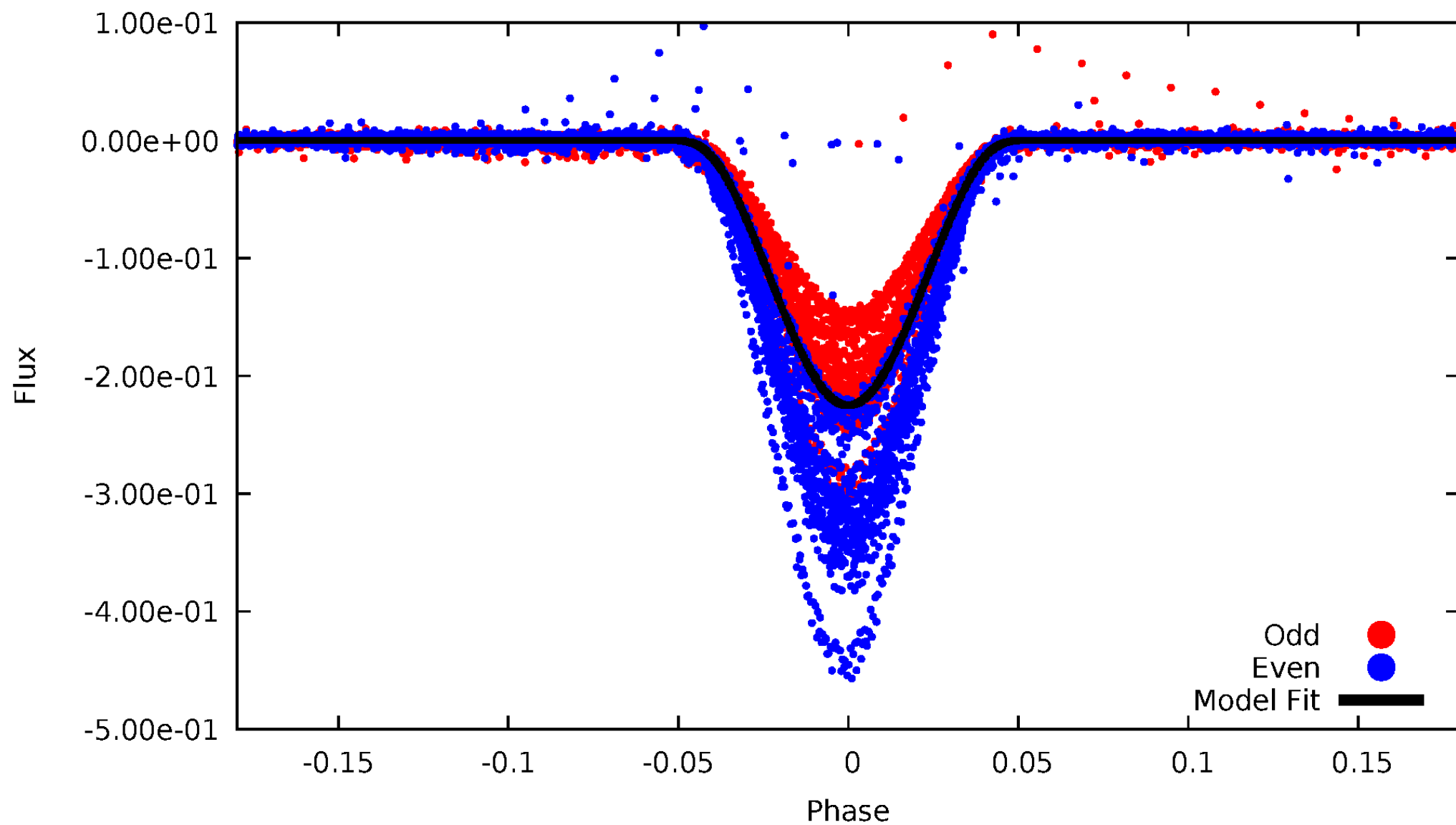


TCE 010960995-01



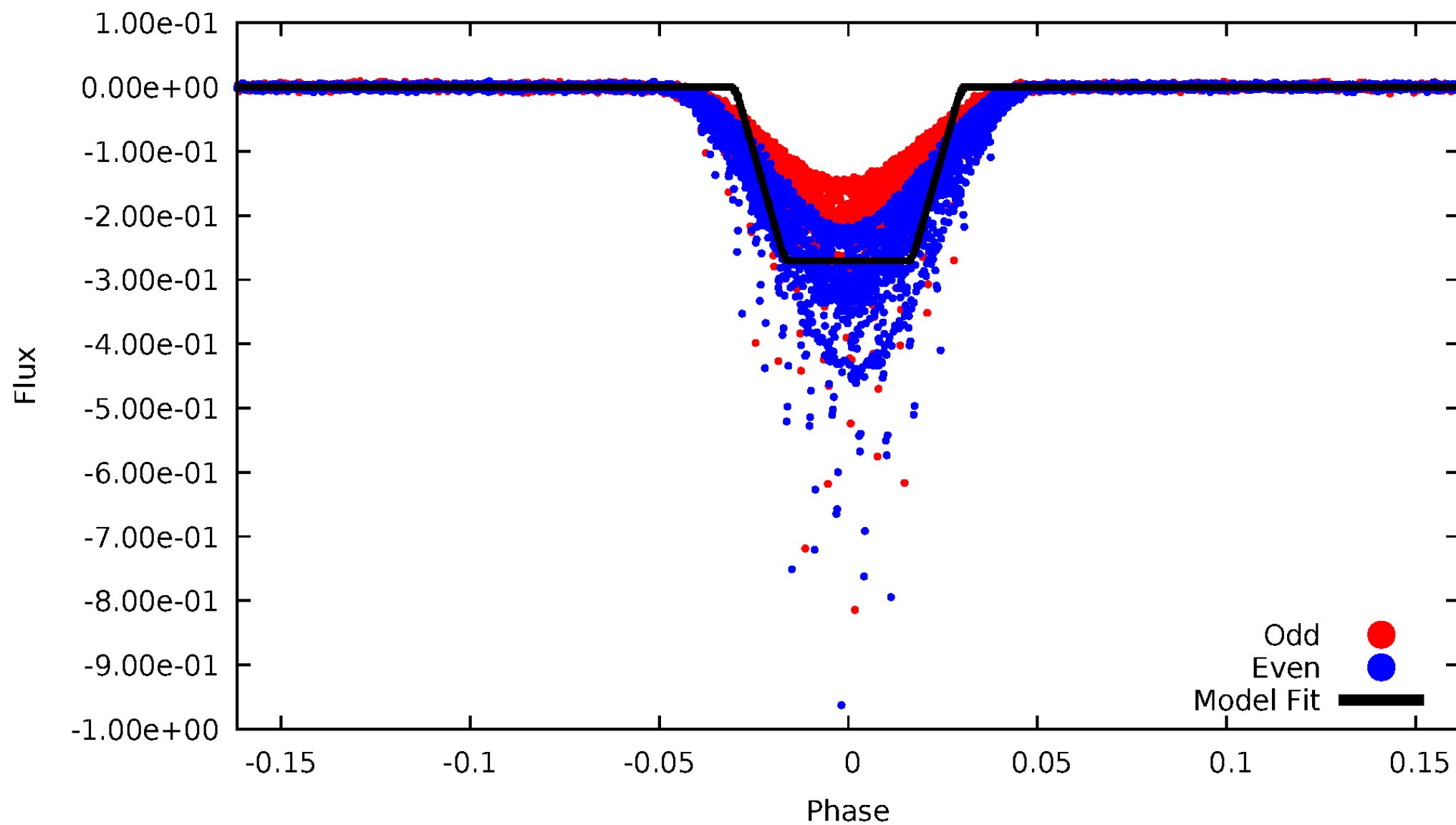
# DV Odd/Even

TCE 010960995-01



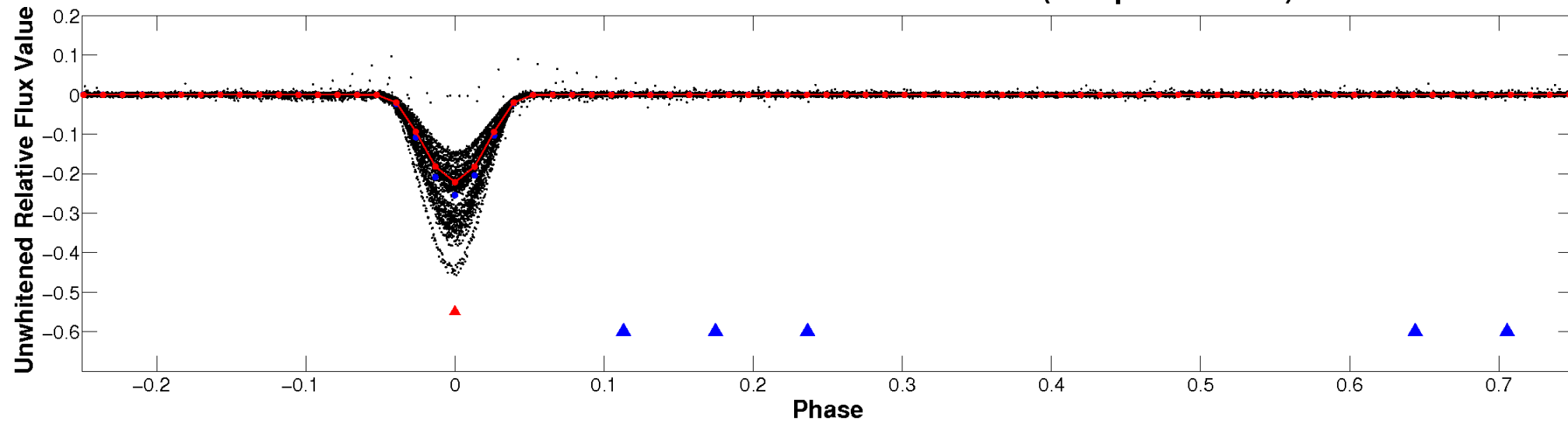
# ALT Odd/Even

TCE 010960995-01

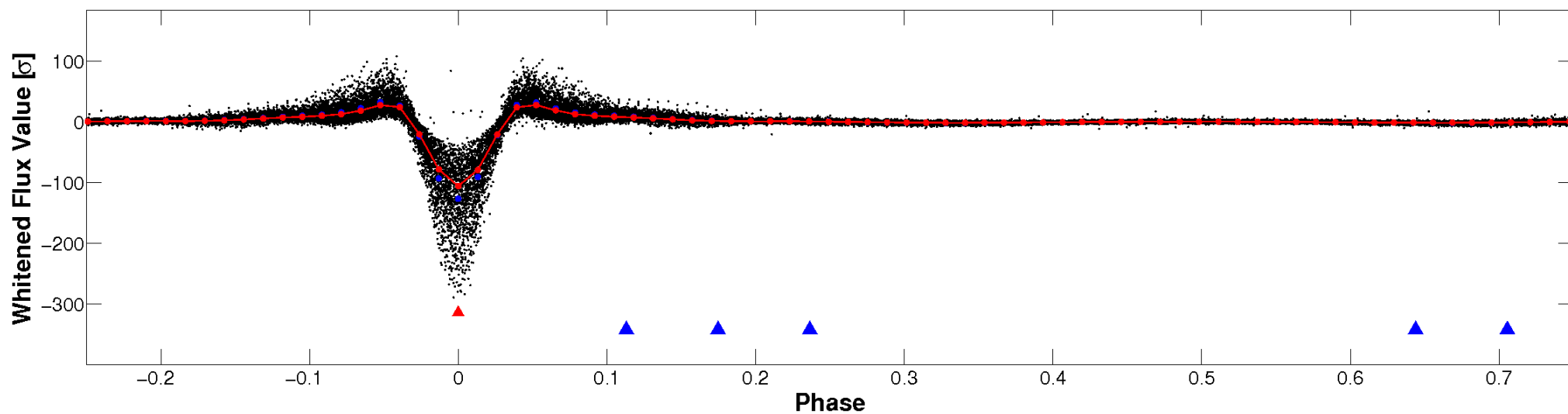


# Non-Whitened Vs. Whitened Light Curve

**Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**



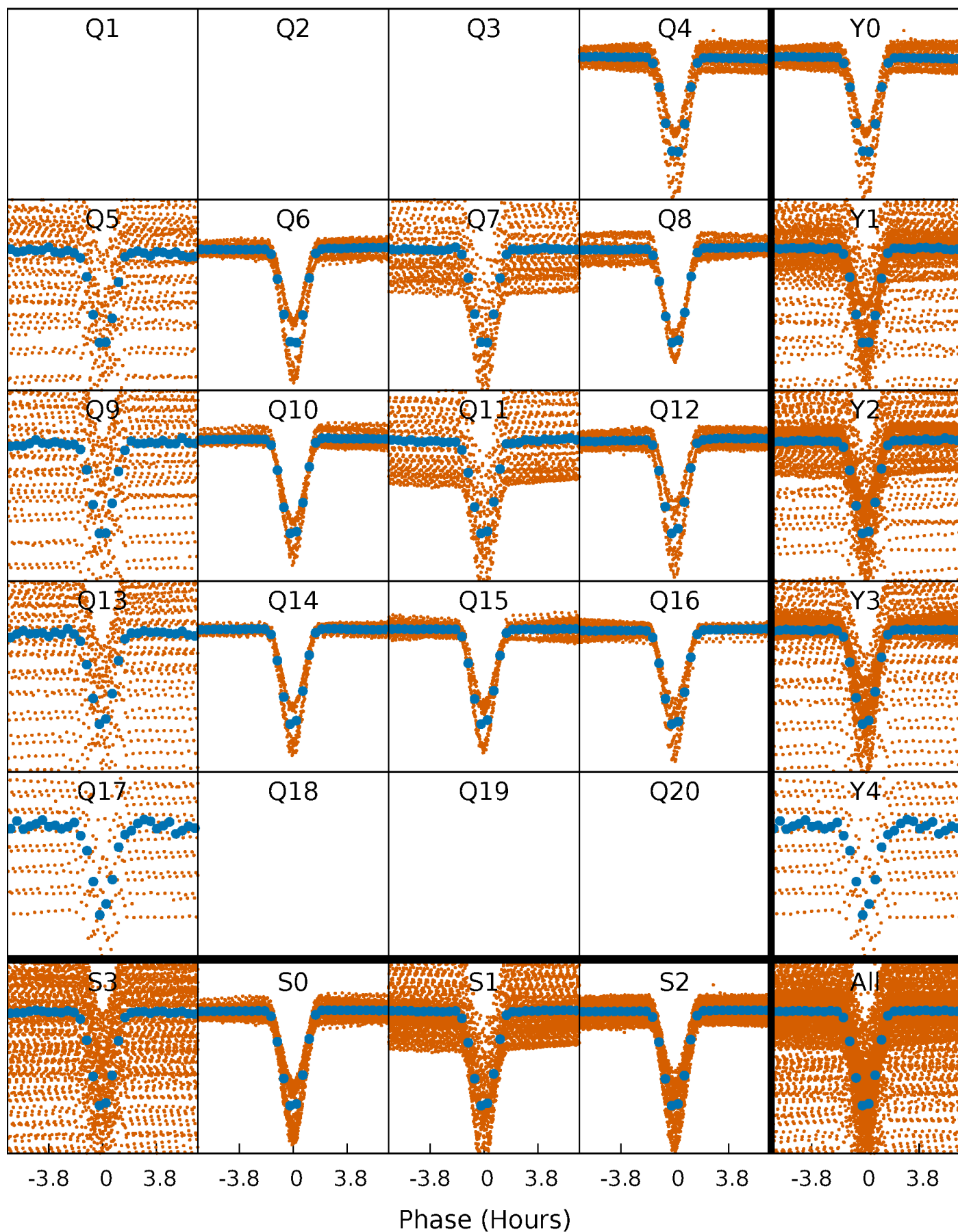
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

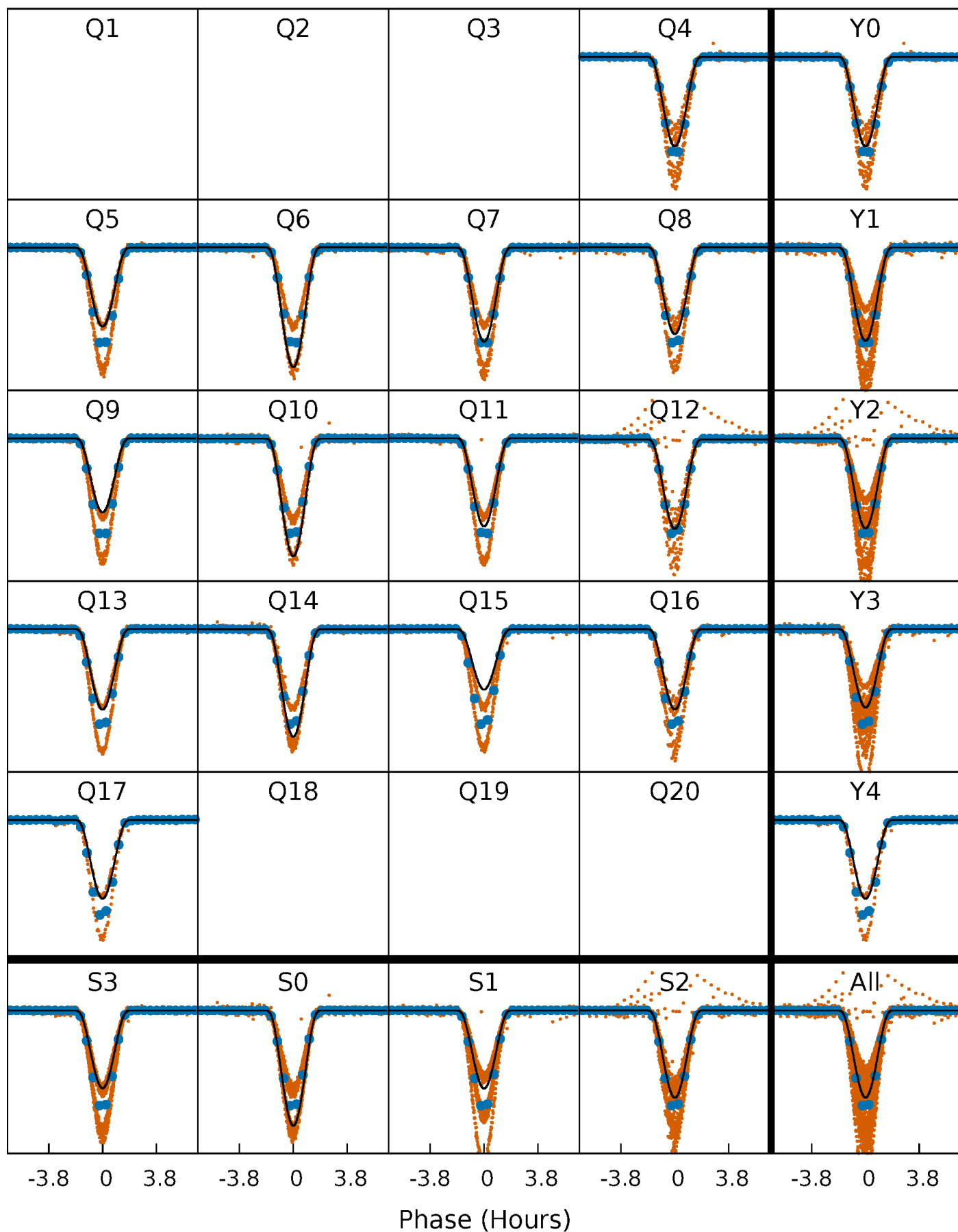
TCE 010960995-01 P= 1.558548 Days  $T_0=131.566182$  (BKJD)





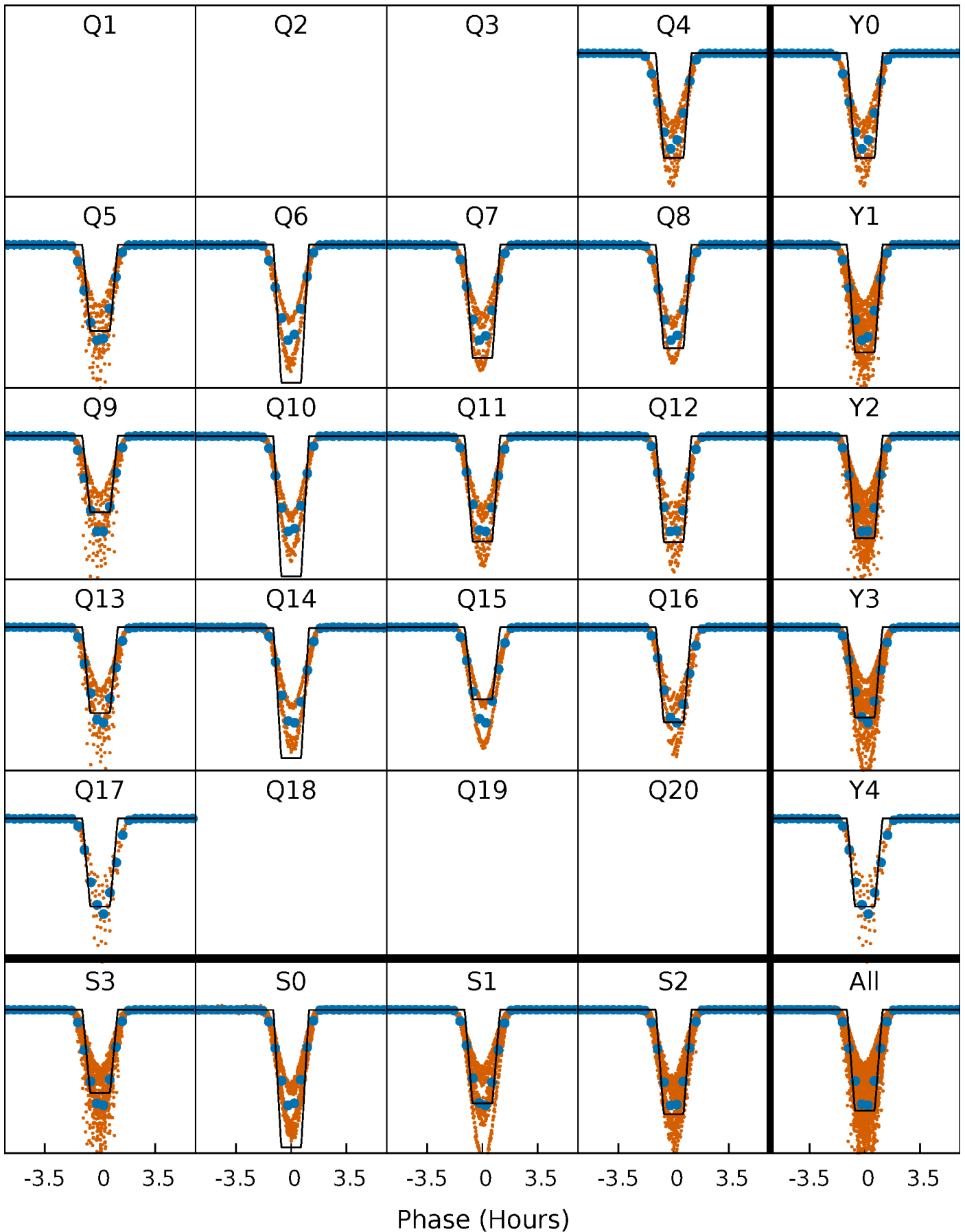
# DV Quarter-Phased Transit Curves

TCE 010960995-01 P= 1.558548 Days  $T_0=131.566182$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

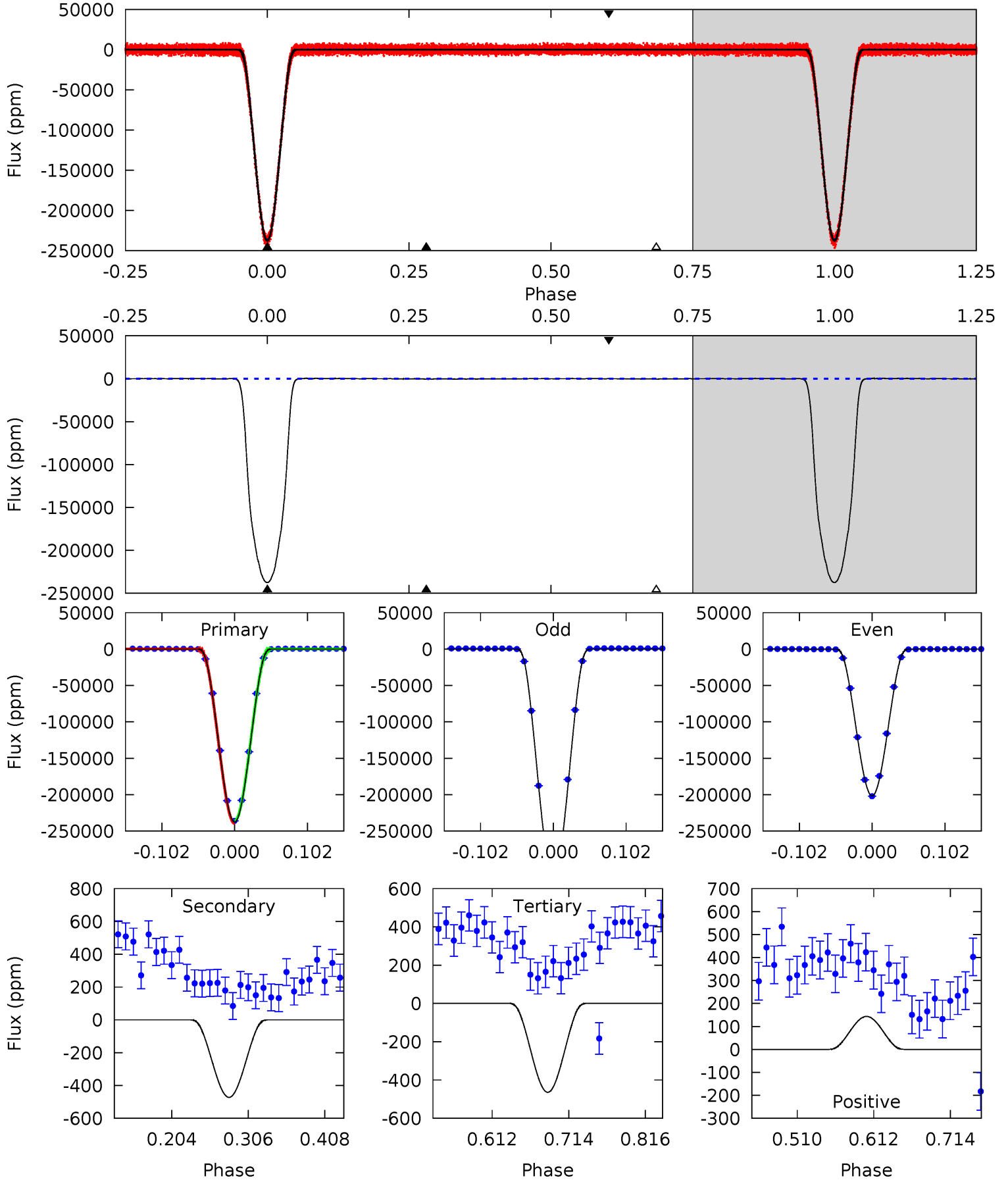
TCE 010960995-01     $P = 1.558532$  Days     $T_0 = 131.573941$  (BKJD)



# DV Model-Shift Uniqueness Test

010960995-01, P = 1.558548 Days, E = 131.566182 Days

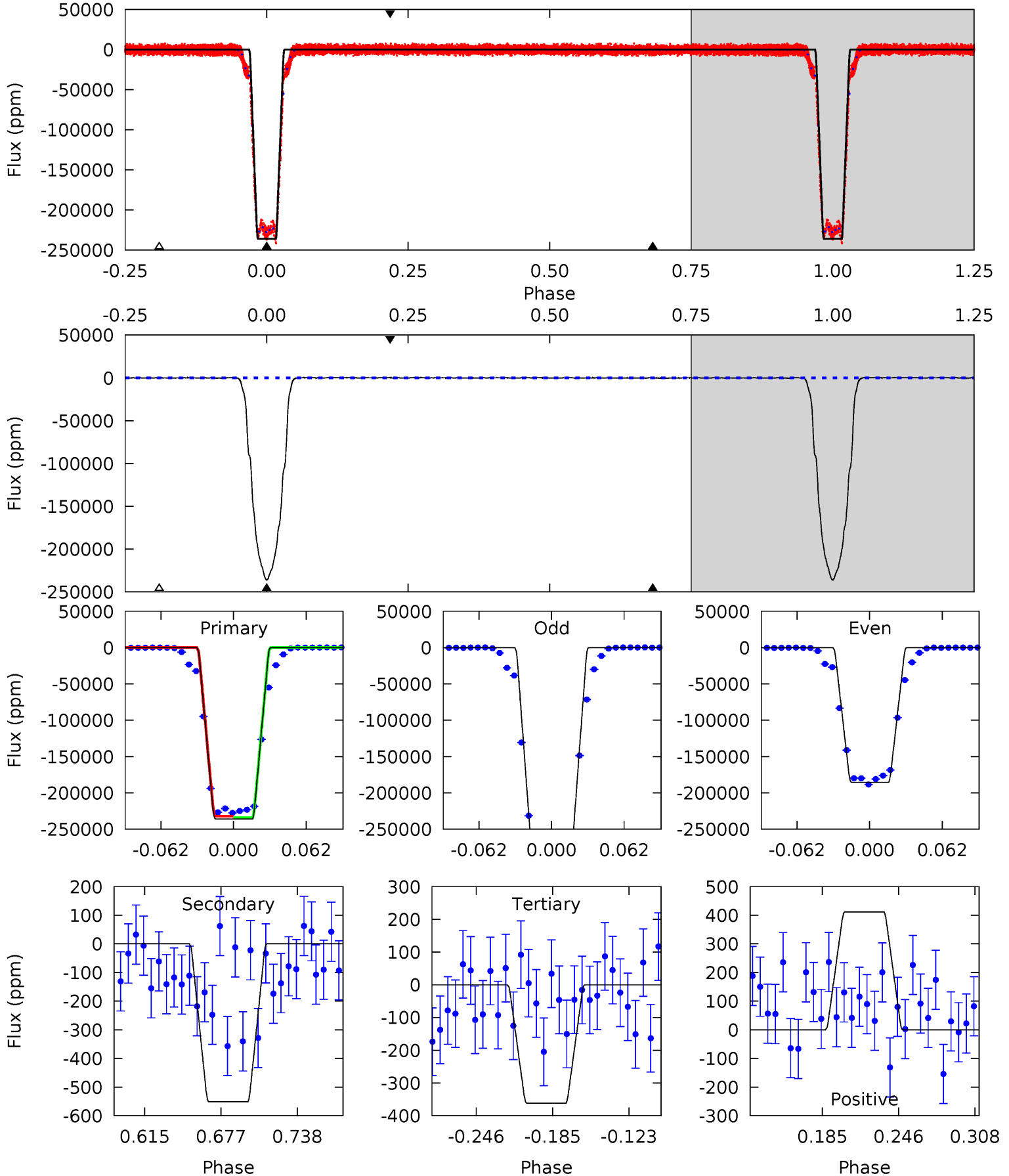
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5534	11.0	10.8	3.34	4.56	1.64	3.90	5524	5531	0.19	7.66	1452	1.09	0.00	0



# Alt Model-Shift Uniqueness Test

010960995-01, P = 1.558532 Days, E = 131.573941 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2329	5.44	3.57	4.06	4.67	1.87	1.35	2325	2325	1.87	1.38	547.1	1.09	0.00	0



### Stellar Parameters For KIC 010960995

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4868^{+175}_{-175}$	$4.582^{+0.060}_{-0.040}$	$-0.220^{+0.300}_{-0.300}$	$0.708^{+0.069}_{-0.069}$	$0.700^{+0.083}_{-0.060}$	$2.773^{+0.730}_{-0.445}$
	+4%/-4%	+1%/-1%	+136%/-136%	+10%/-10%	+12%/-9%	+26%/-16%
Source	KIC0	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 010960995-01 / KOI 3564.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-472 \pm 43$	$41.92^{+5.37}_{-5.15}$	$1642^{+75}_{-67}$	$-2171^{+54}_{-60}$	$0.081^{+0.026}_{-0.018}$
Alt.	$-551 \pm 101$	$40.24^{+5.51}_{-5.34}$	$1646^{+74}_{-68}$	$-2147^{+68}_{-64}$	$0.101^{+0.042}_{-0.027}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

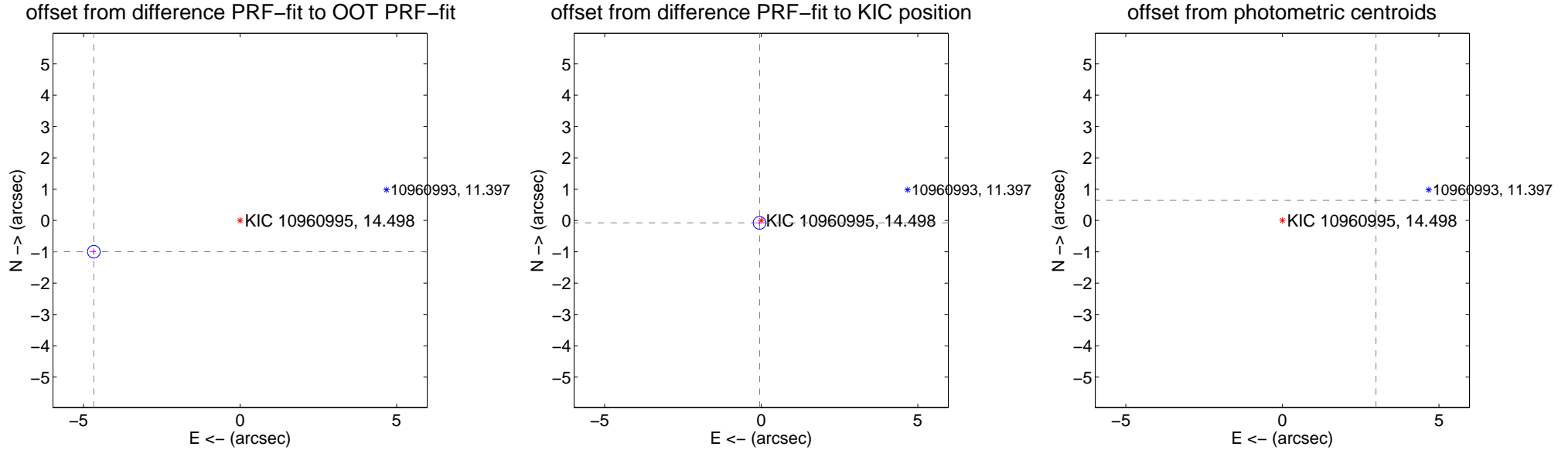
## DV Centroid Data

Supplemental centroid analysis for 010960995-01. Kepler magnitude: 14.50. Transit SNR 2058.38

There are 14 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 4.68 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

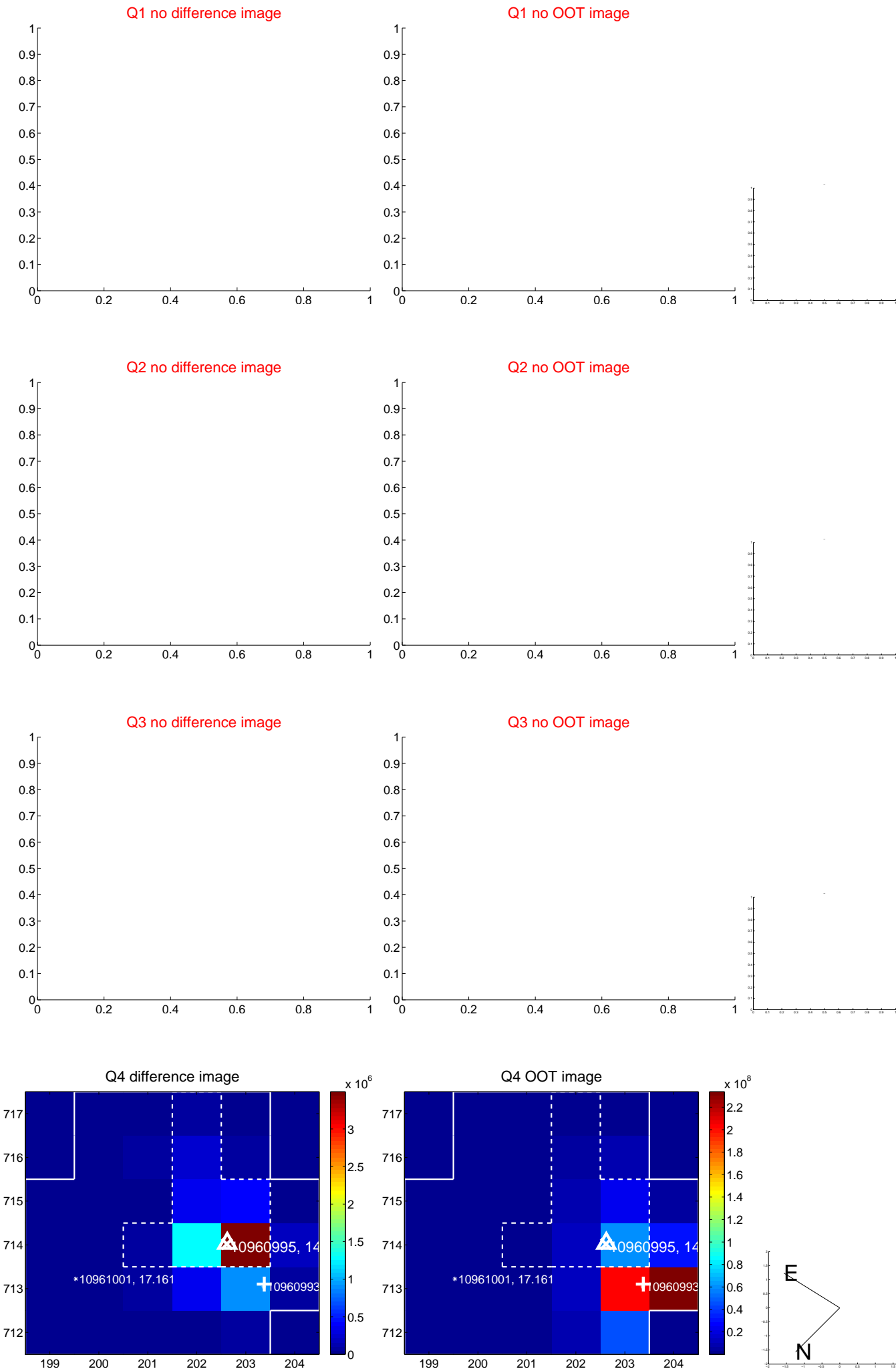
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.776 \pm 0.067$	70.99	$4.670 \pm 0.067$	$-0.997 \pm 0.068$
PRF-fit source offset from KIC position	$0.093 \pm 0.068$	1.37	$0.053 \pm 0.067$	$-0.076 \pm 0.068$
photometric centroid source offset	$3.06 \pm 0.00$	13721.98	$-2.99 \pm 0.00$	$0.64 \pm 0.00$



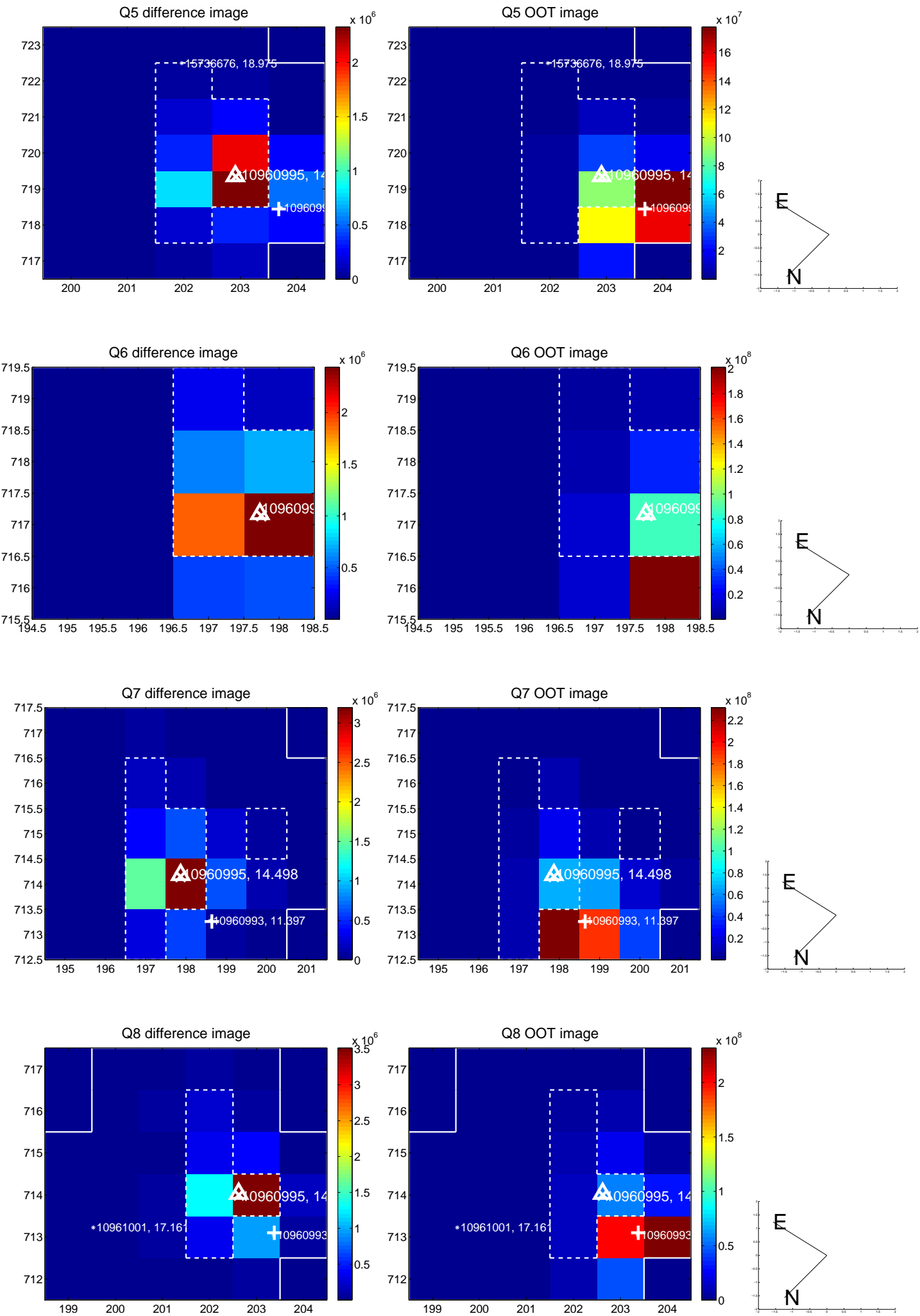
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.



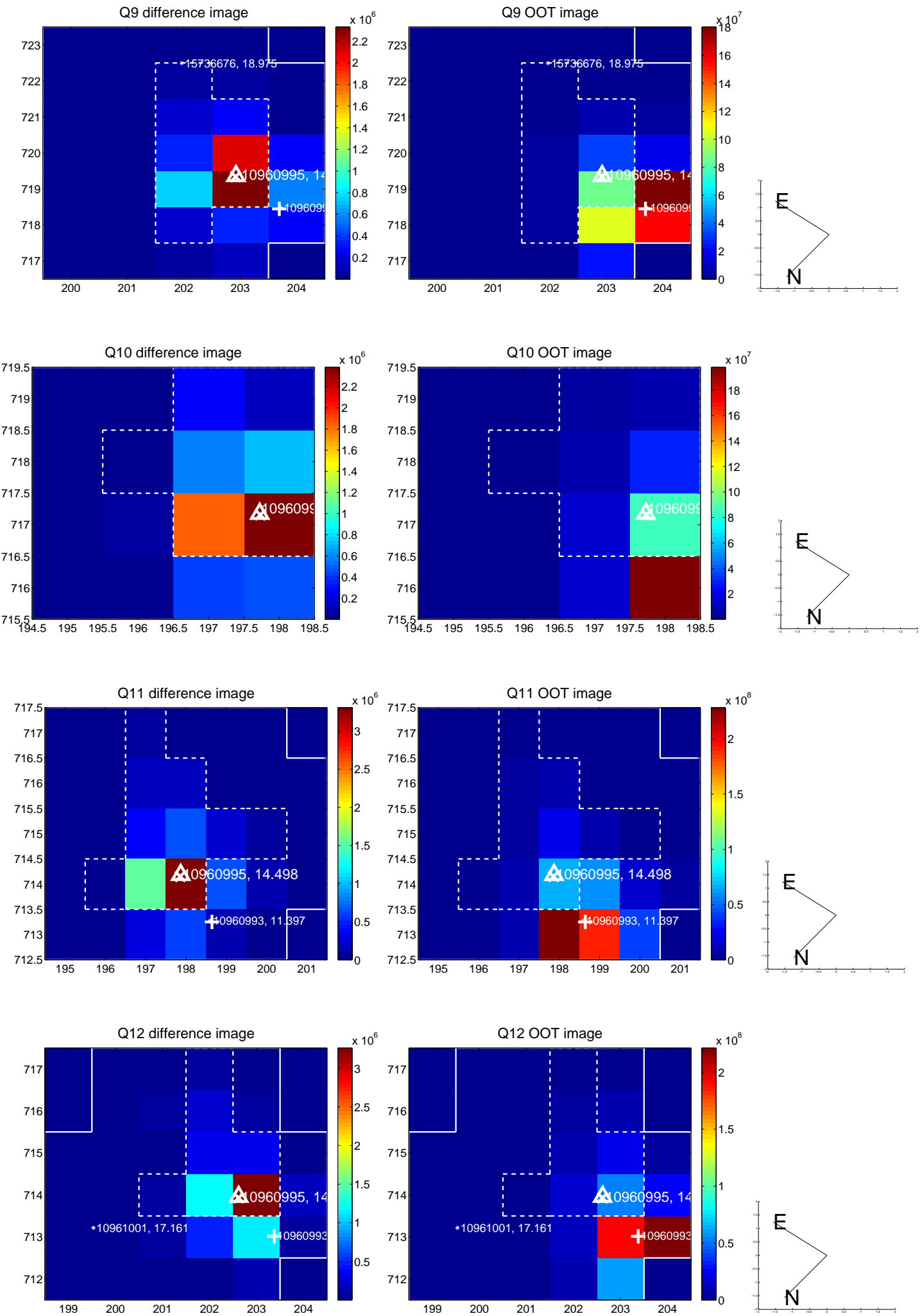
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



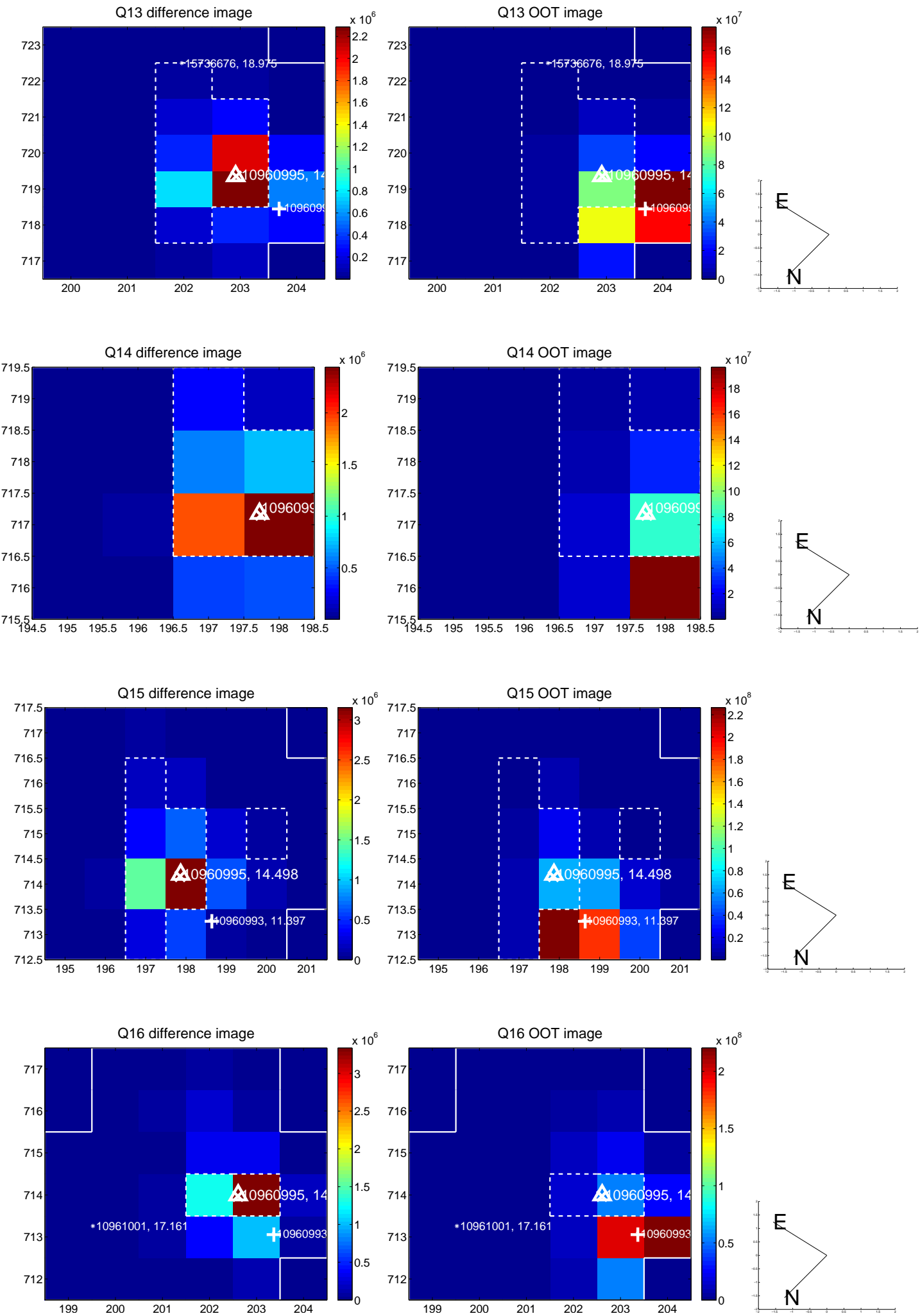
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



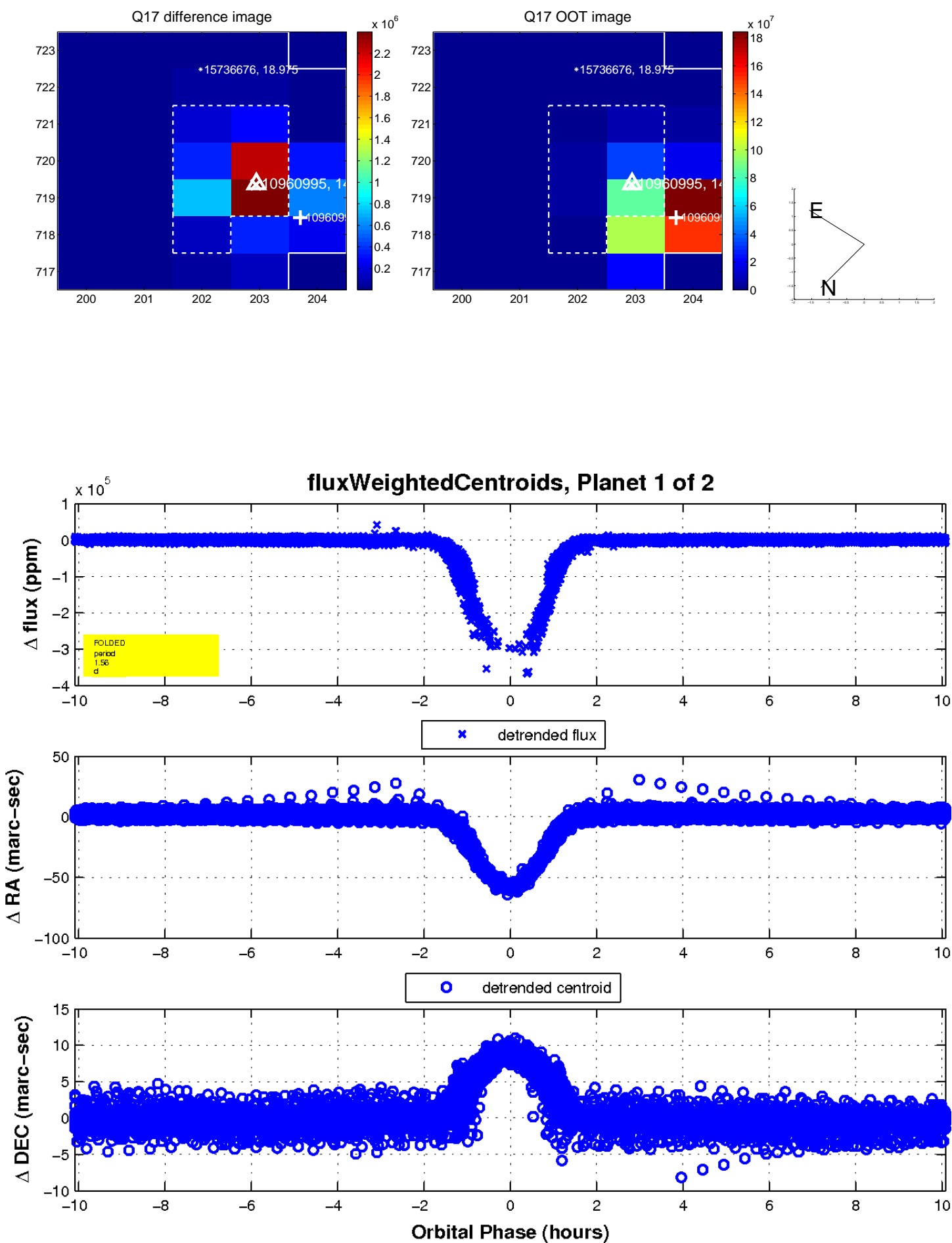
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



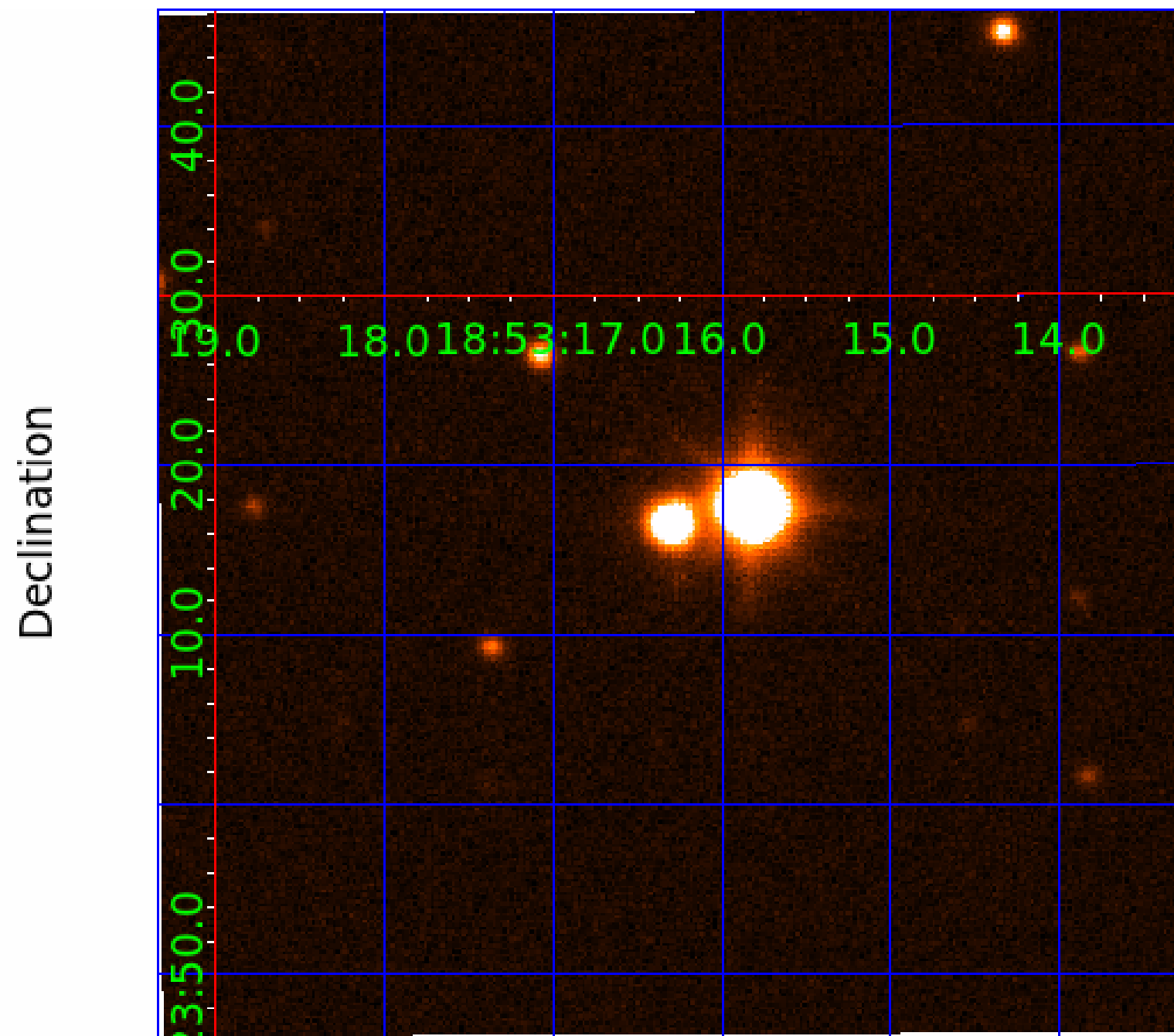
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image





# KIC 010960995

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010960995-01	OBS	3564.01	1.558548	131.566182	224959.4	3.362	5320.7	2058.4	0.71	4868	42.17	462.76
010960995-02	OBS	No	306.206566	159.988565	2747.1	3.500	12.1	-1.0	0.71	4868	3.59	0.41

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010960995-01	OBS	FP	0.00	0	1	0	0	DEPTH_ODDEVEN_DV—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—CENT_KIC_POS
010960995-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQU_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

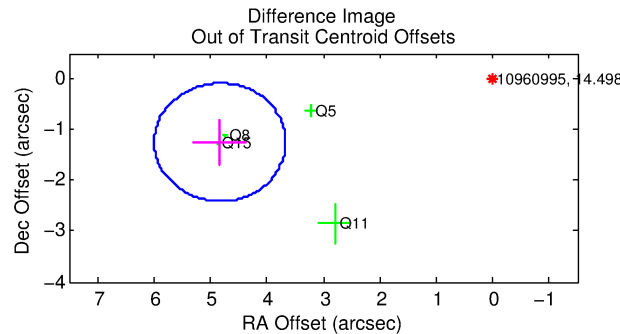
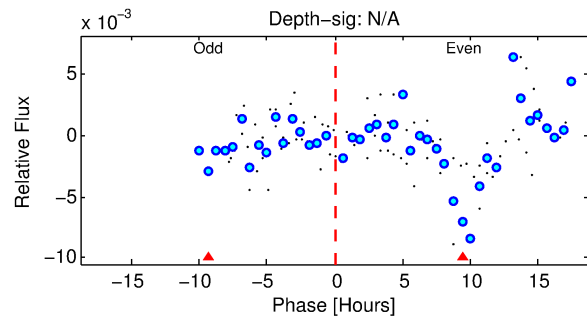
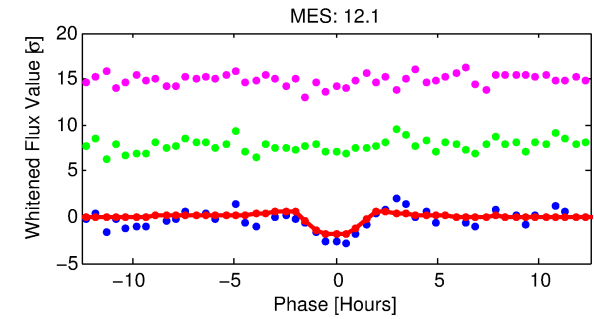
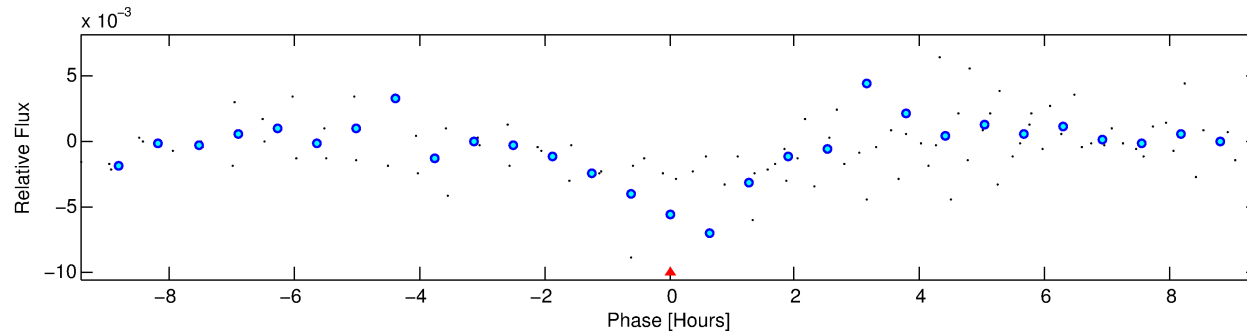
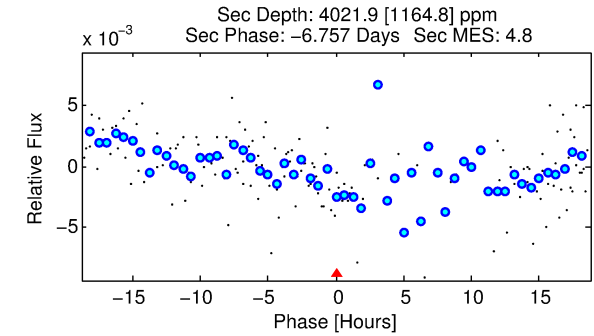
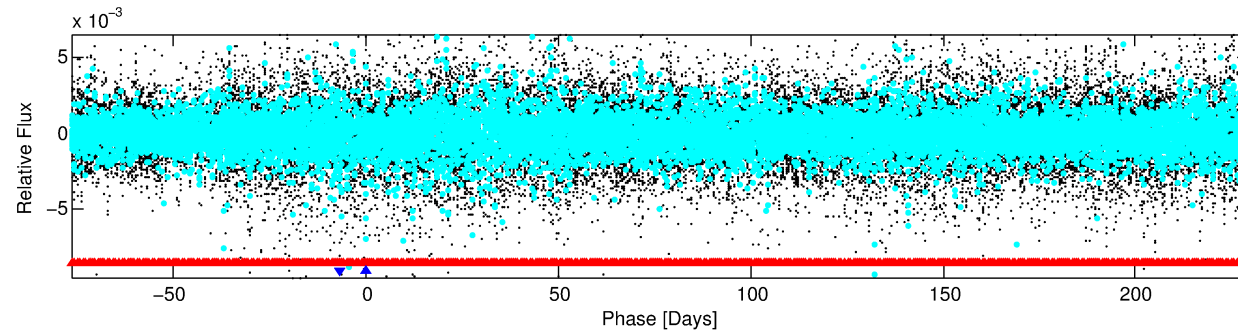
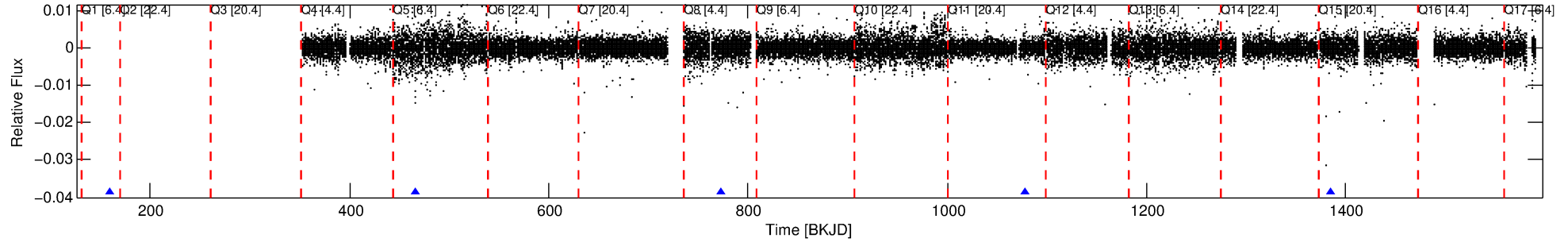
## Ephemeris Match Information For 010960995-02

No Significant Match Found

# DV One-Page Summary

KIC: 10960995 Candidate: 2 of 2 Period: 306.207 d  
KOI: K03564 Corr: No Ephemeris Match

Kp: 14.50 R\*: 0.71 Rs Teff: 4868.0 K Logg: 4.58 Fe/H: -0.220



TPS TCE Results:

Period = 306.20657 d  
Epoch = 159.9886 BKJD

DV fit results are unavailable

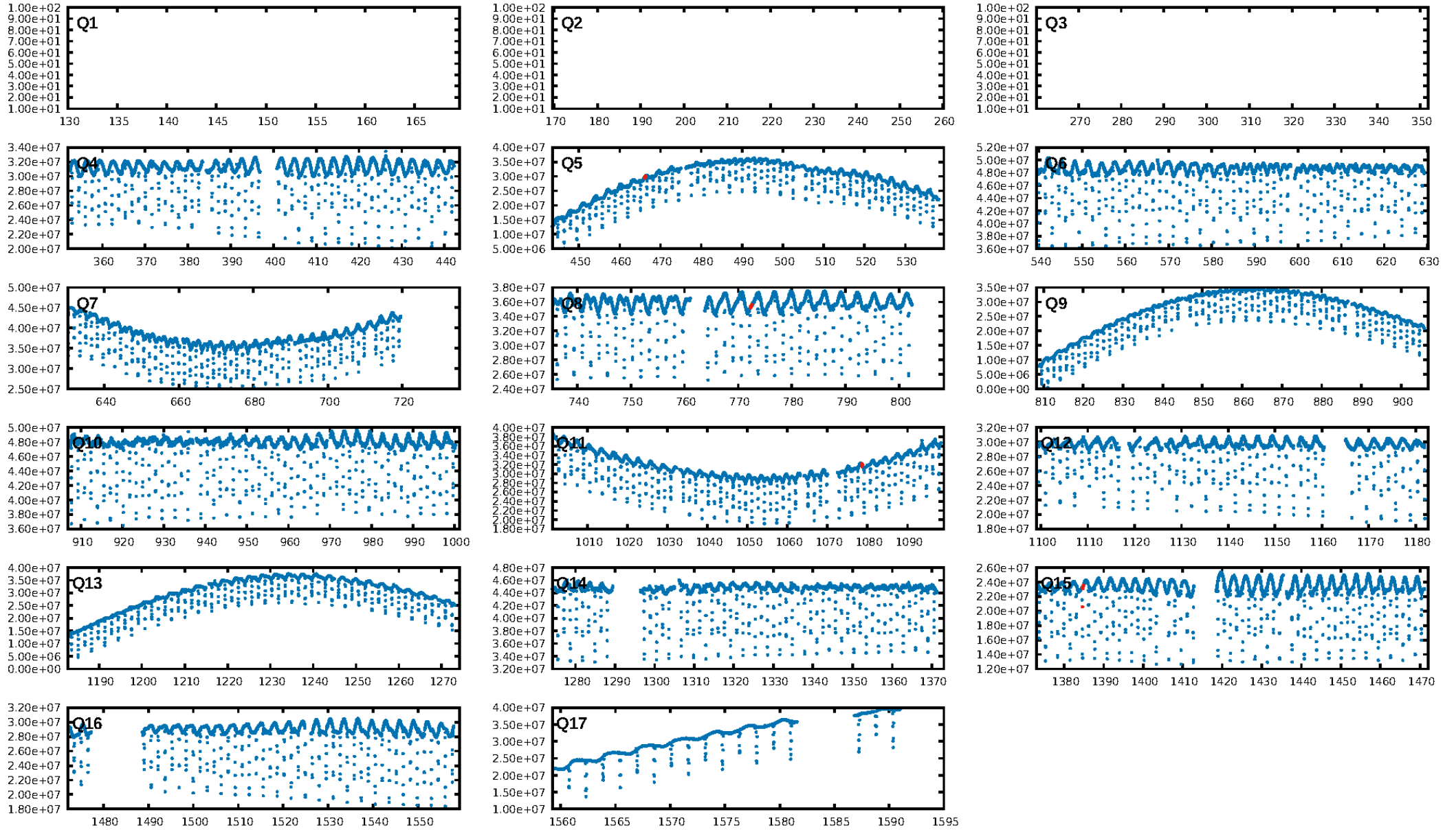
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1506.62σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 11.34  
Centroid-sig: N/A  
Centroid-so: 2.994 arcsec [15.72σ]  
OotOffset-rm: 4.988 arcsec [12.85σ]  
KicOffset-rm: 0.219 arcsec [0.55σ]  
OotOffset-st: 0/2/1/1 [4]  
KicOffset-st: 0/2/1/1 [4]  
DiffImageQuality-fgm: 0.00 [0/4]  
DiffImageOverlap-fno: 0.50 [2/4]

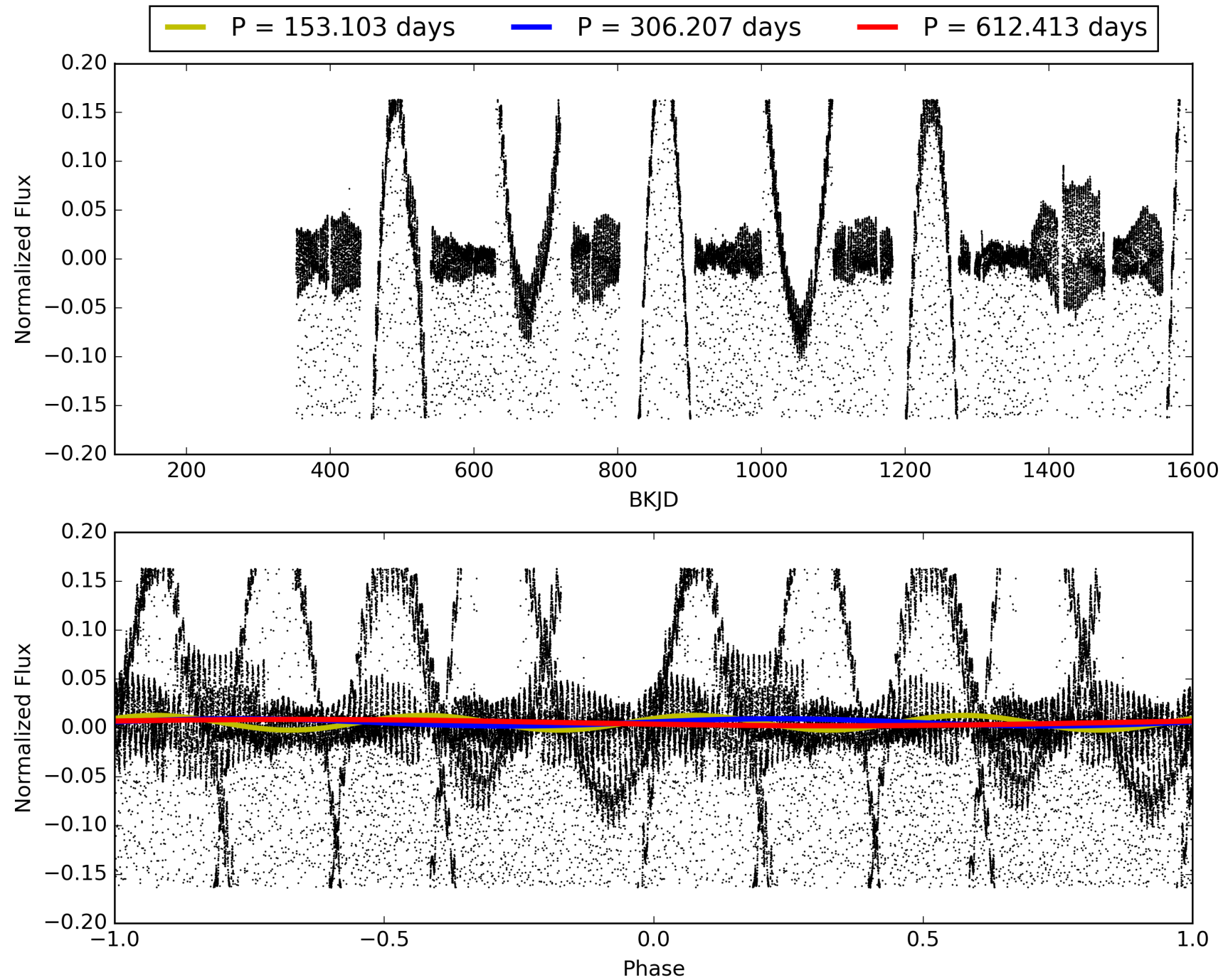
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010960995-02, PDC Light Curves

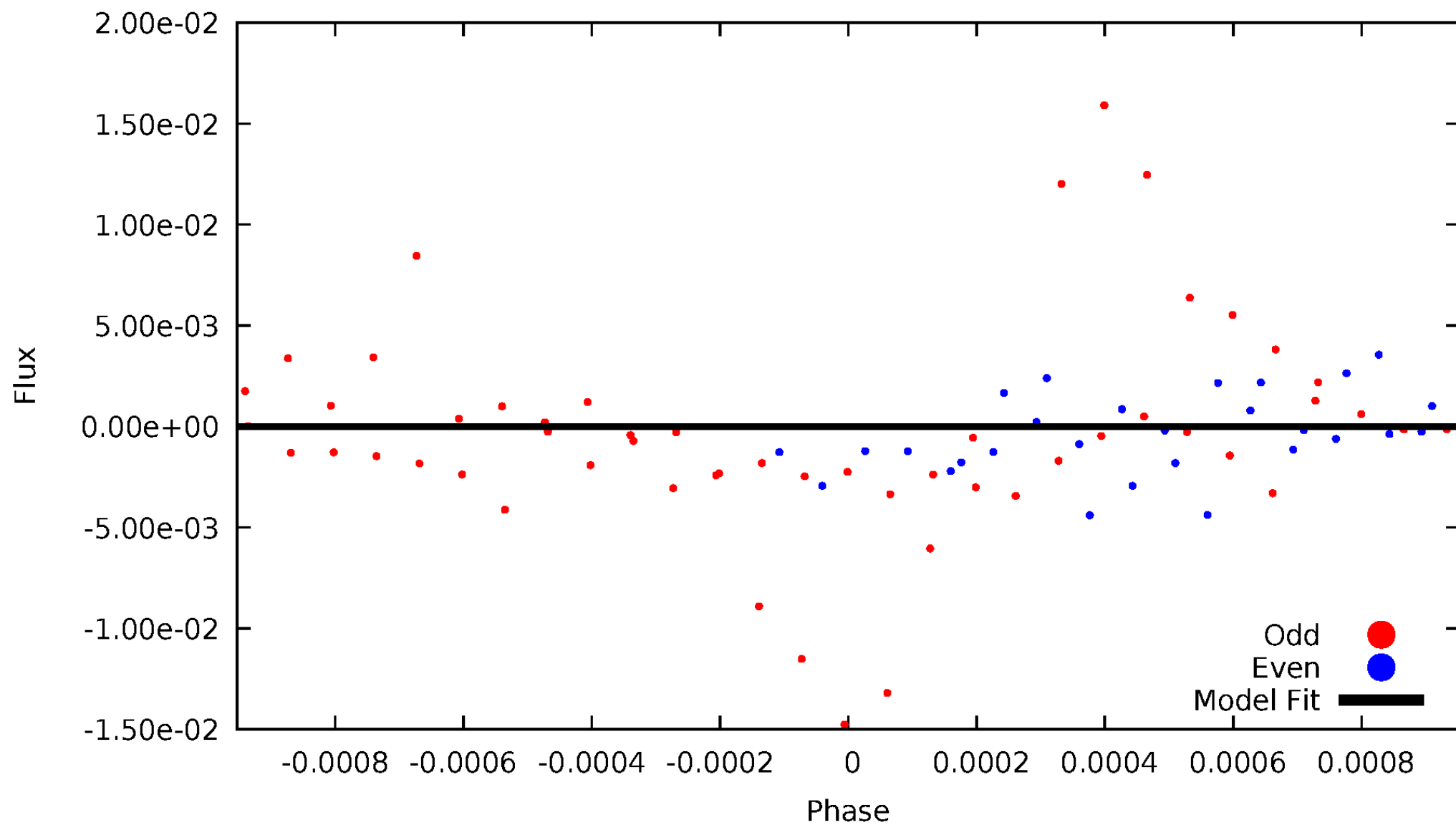


# TCE 010960995-02



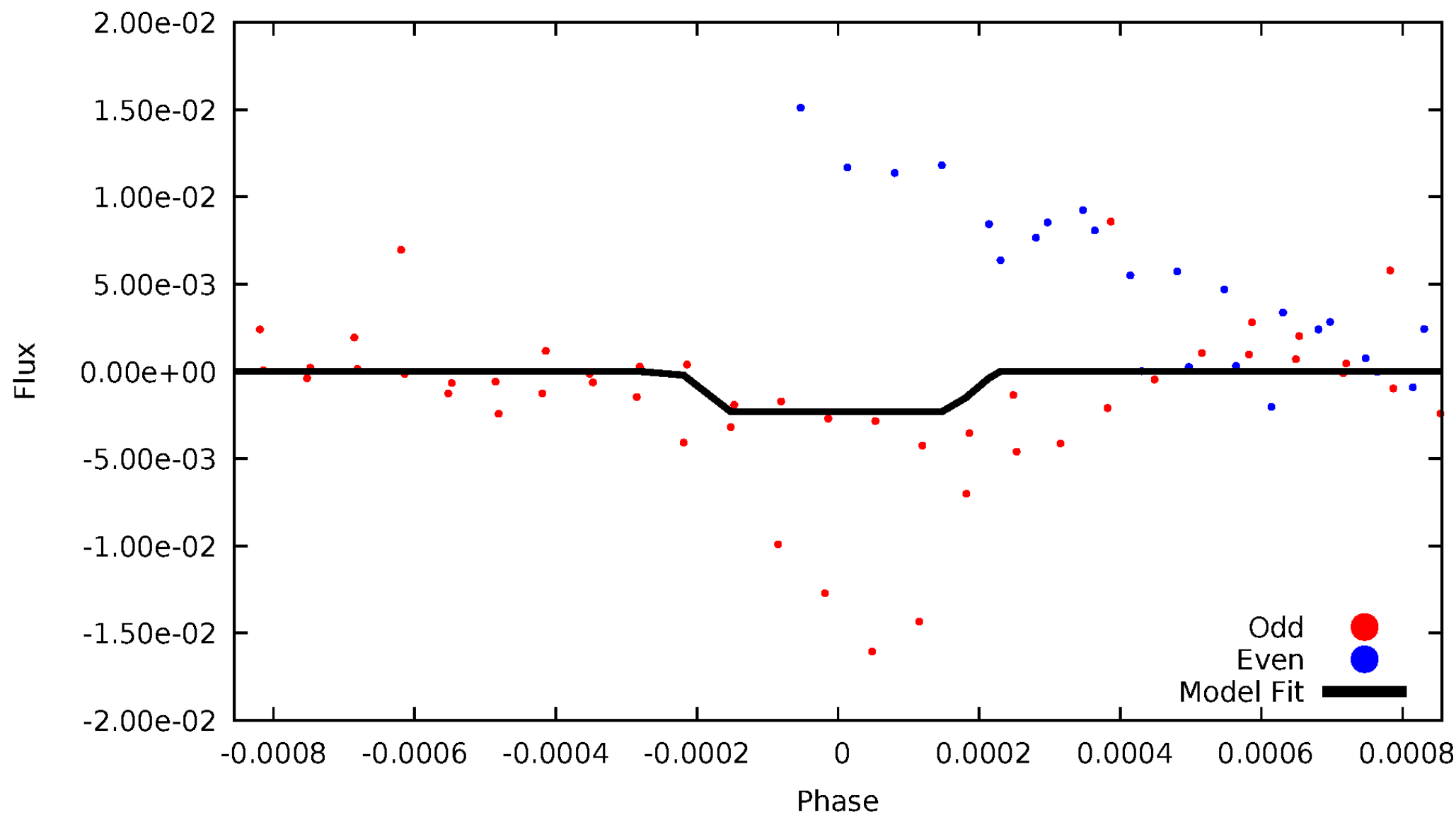
# DV Odd/Even

TCE 010960995-02



# ALT Odd/Even

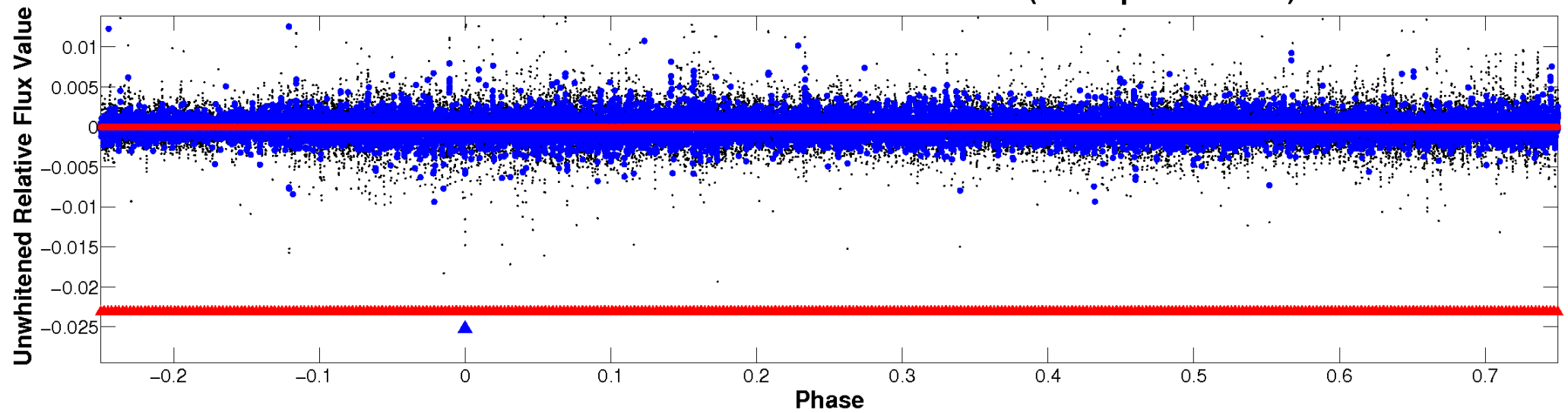
TCE 010960995-02



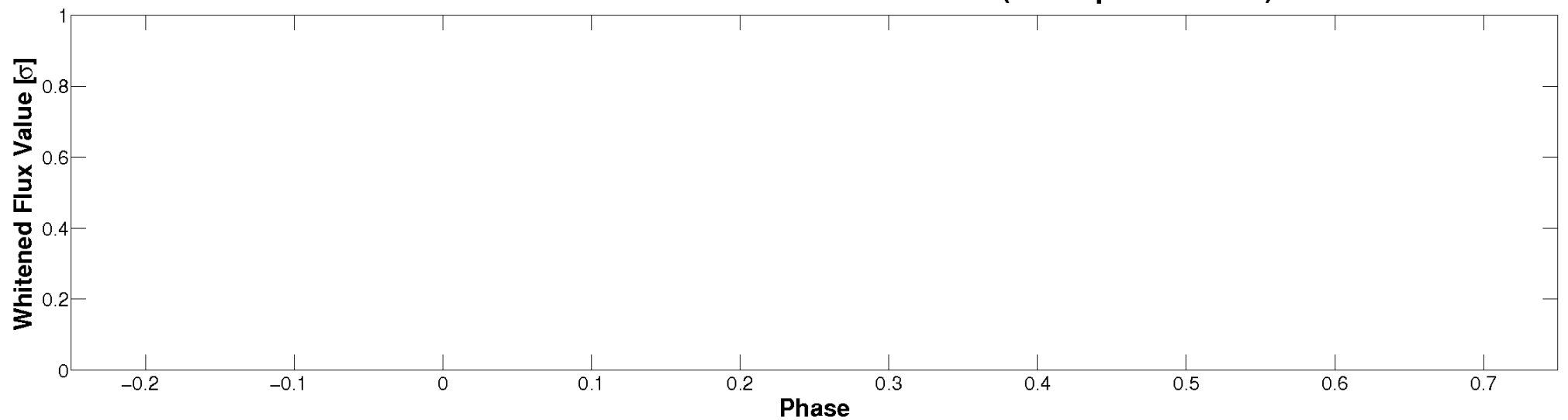


# Non-Whitened Vs. Whitened Light Curve

**Planet 2 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**

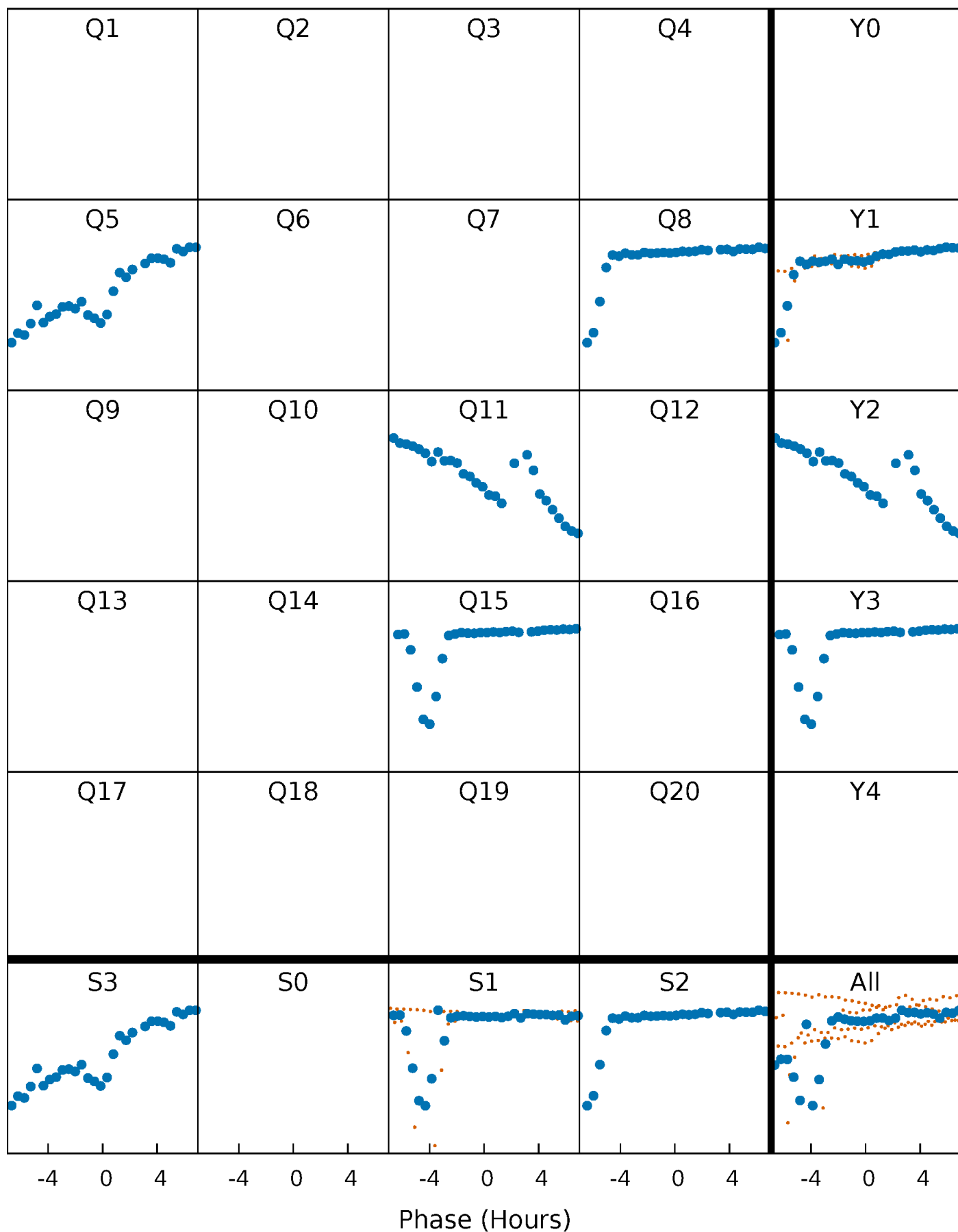


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



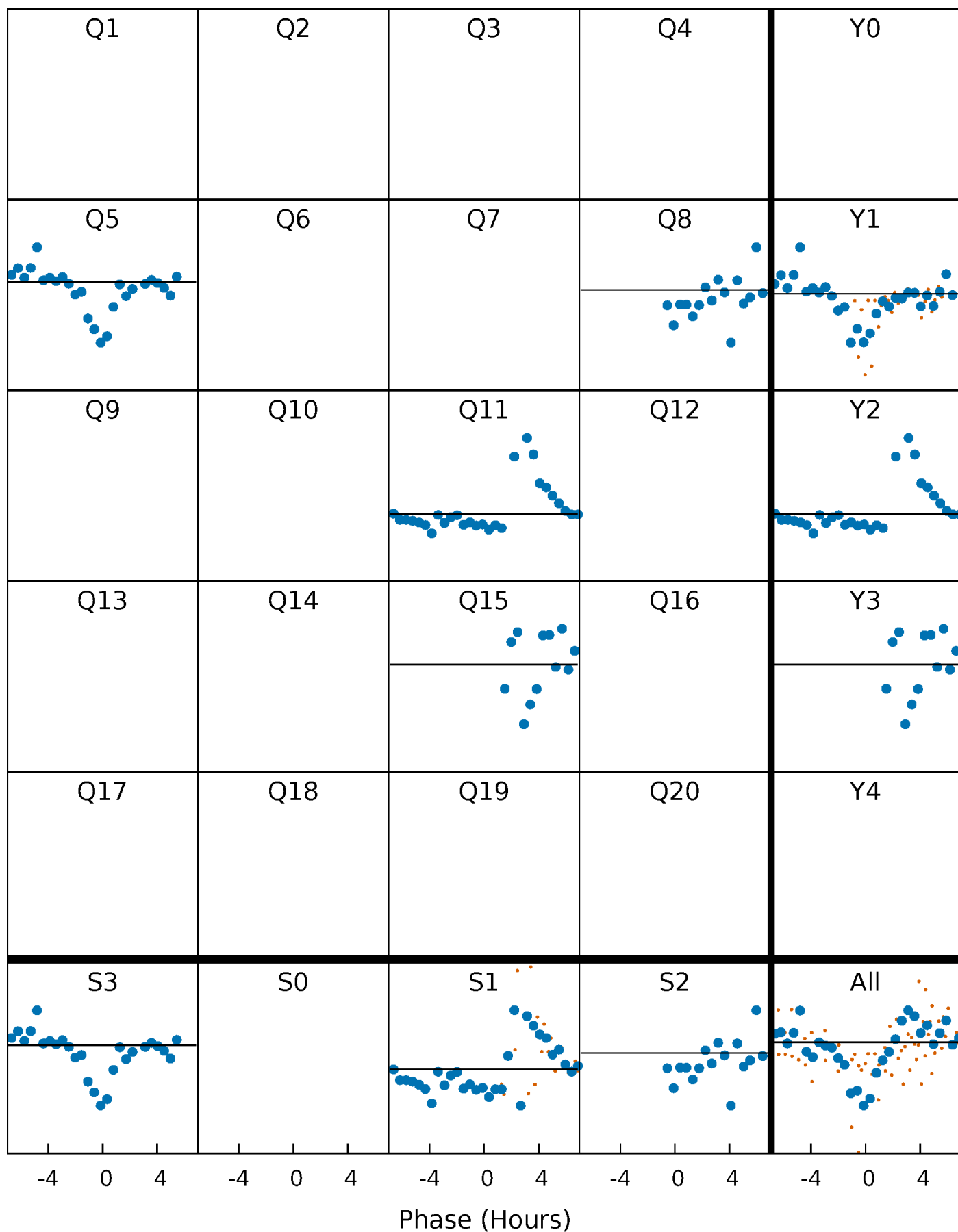
# PDC Quarter-Phased Transit Curves

TCE 010960995-02     $P=306.206566$  Days     $T_0=159.988565$  (BKJD)



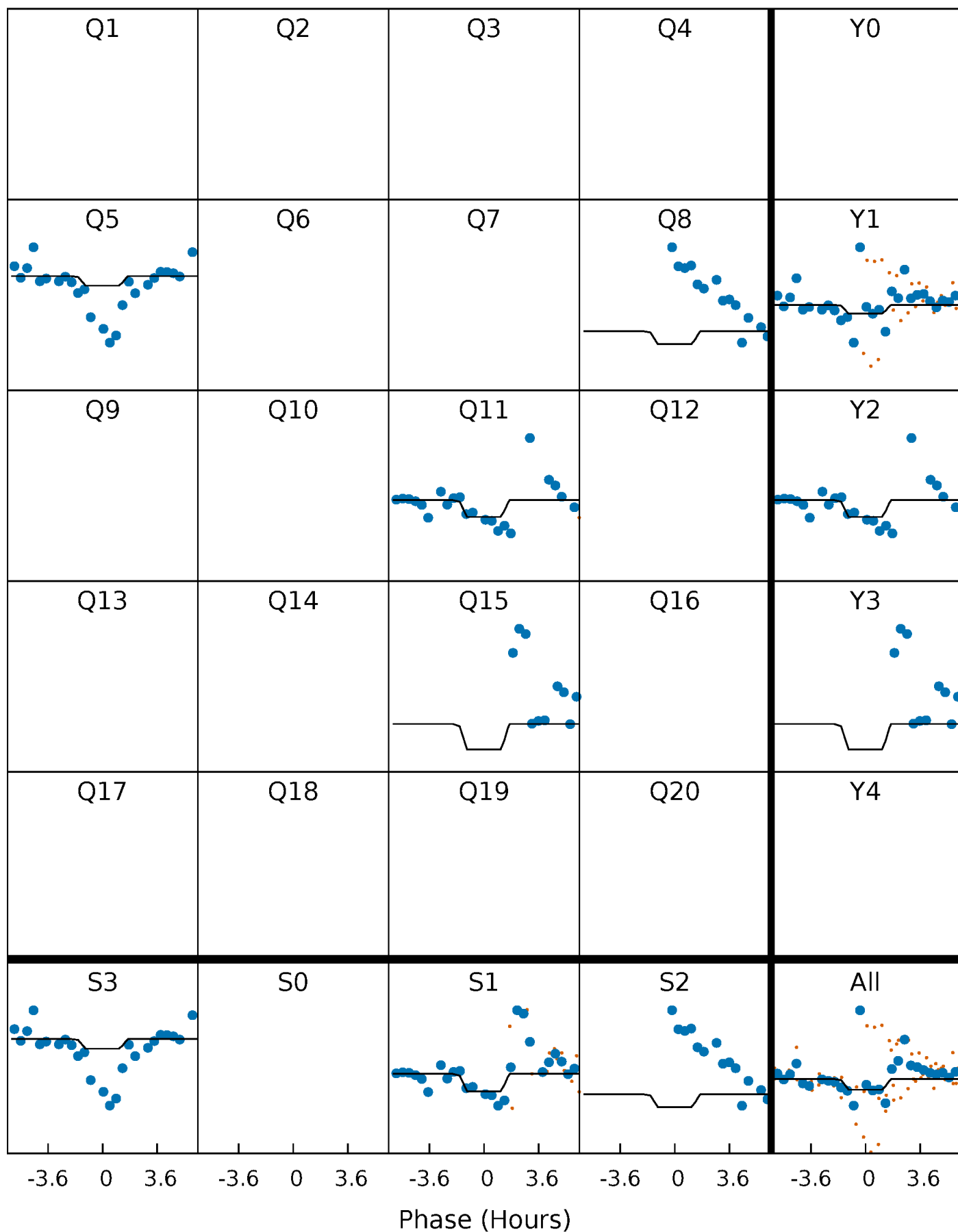
# DV Quarter-Phased Transit Curves

TCE 010960995-02     $P=306.206566$  Days     $T_0=159.988565$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

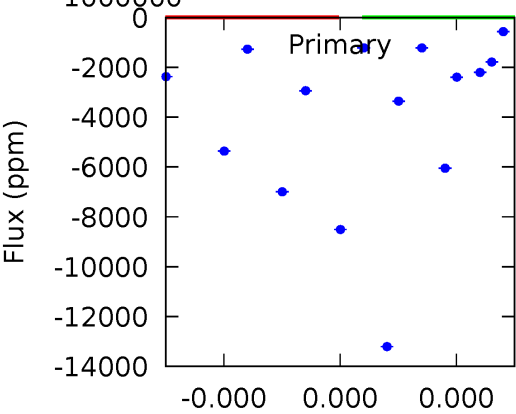
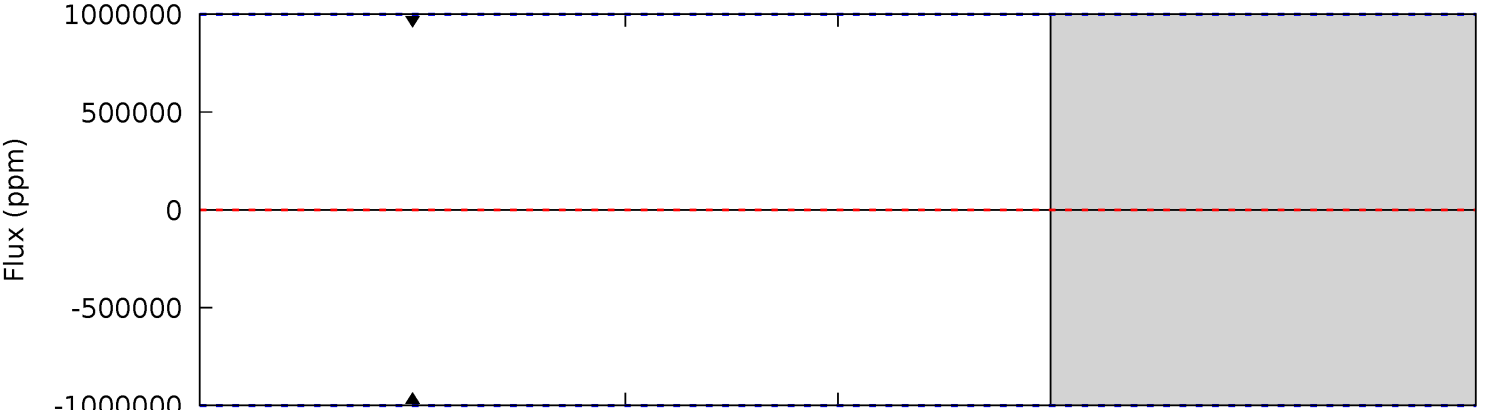
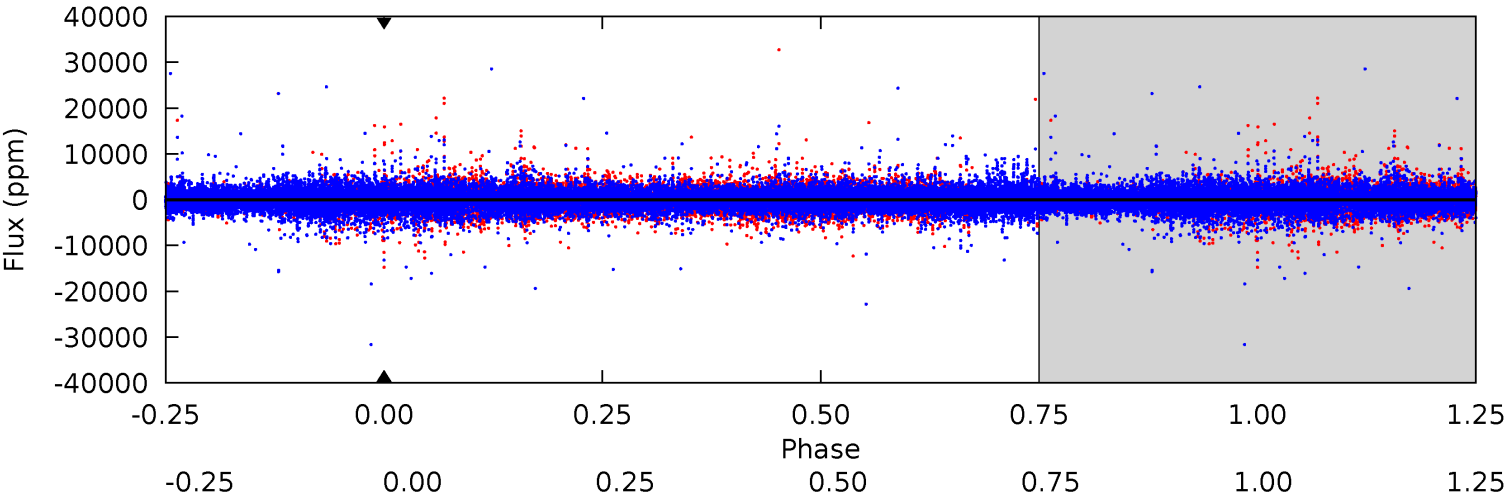
TCE 010960995-02 P=306.206566 Days  $T_0=159.971941$  (BKJD)



# DV Model-Shift Uniqueness Test

010960995-02, P = 306.206566 Days, E = 159.988565 Days

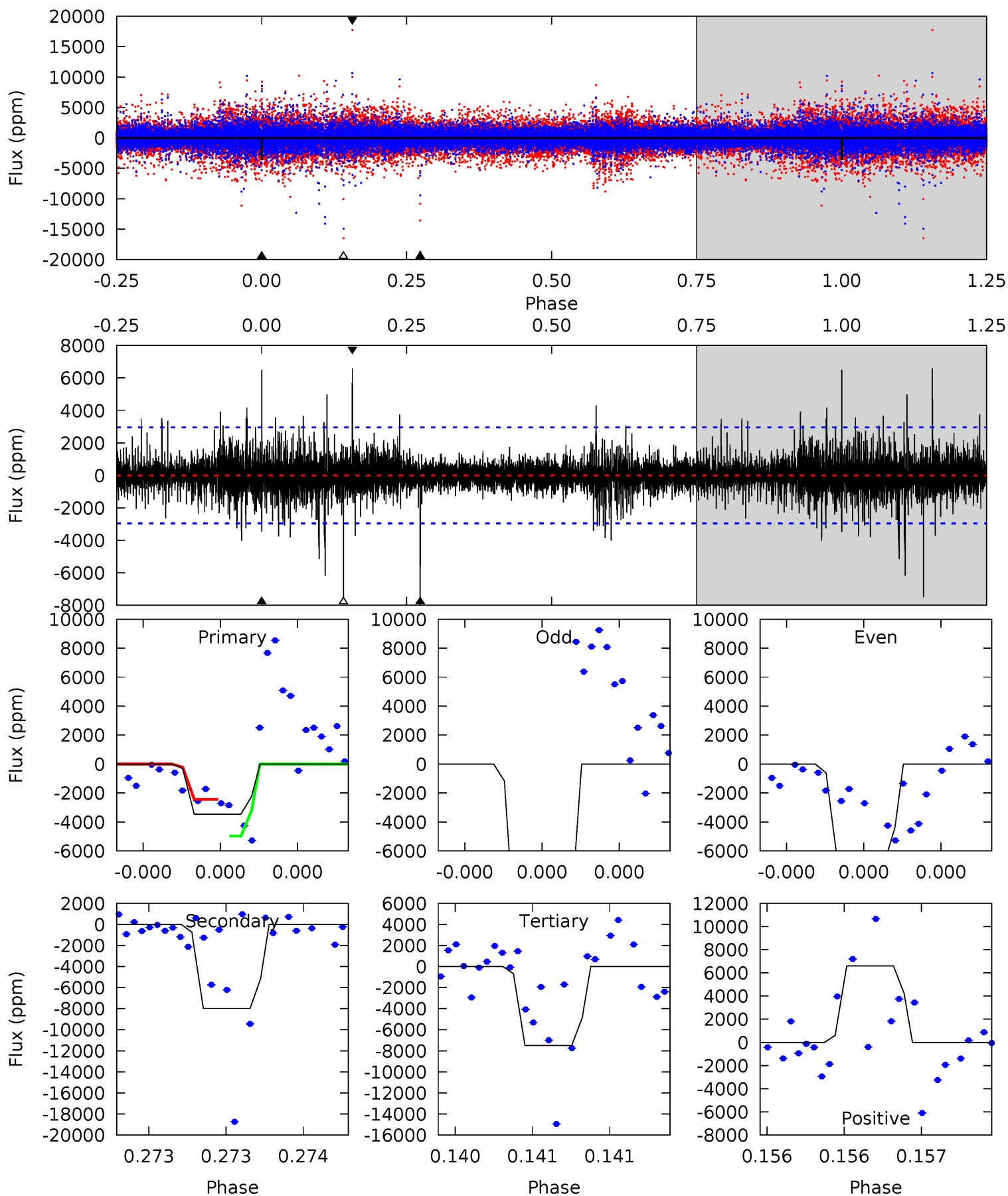
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

010960995-02, P = 306.206566 Days, E = 159.971941 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.56	15.1	14.2	12.5	5.59	3.51	1.29	-7.63	-5.92	0.91	2.62	5.29	0.16	0.45	2.39





### Stellar Parameters For KIC 010960995

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4868^{+175}_{-175}$	$4.582^{+0.060}_{-0.040}$	$-0.220^{+0.300}_{-0.300}$	$0.708^{+0.069}_{-0.069}$	$0.700^{+0.083}_{-0.060}$	$2.773^{+0.730}_{-0.445}$
	+4%/-4%	+1%/-1%	+136%/-136%	+10%/-10%	+12%/-9%	+26%/-16%
Source	KIC0	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 010960995-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$6.71^{+6.20}_{-4.47}$	$283^{+12}_{-12}$	$4169^{+9217}_{-15436}$	$25335^{+1659207}_{-1086256}$
Alt.	$-7975 \pm 528$	$6.87^{+6.05}_{-4.63}$	$283^{+13}_{-11}$	$4859^{+3889}_{-1040}$	$59539^{+474618}_{-42895}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

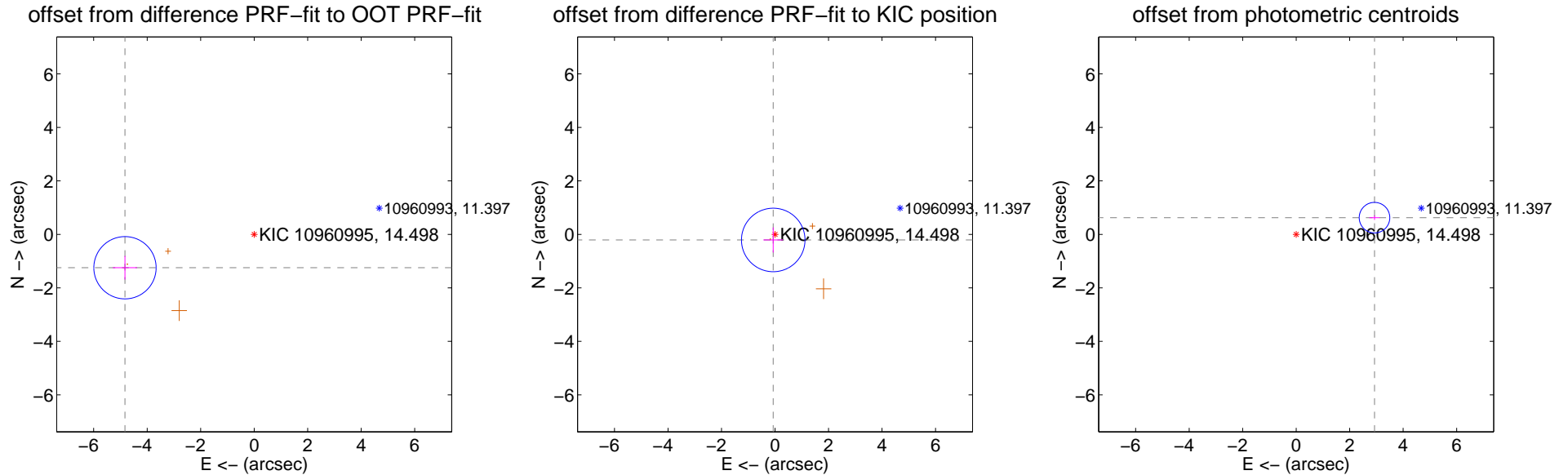
## DV Centroid Data

Supplemental centroid analysis for 010960995-02. Kepler magnitude: 14.50. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 4.92 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.988 \pm 0.388$	12.85	$4.829 \pm 0.454$	$-1.247 \pm 0.440$
PRF-fit source offset from KIC position	$0.219 \pm 0.396$	0.55	$0.067 \pm 0.369$	$-0.209 \pm 0.470$
photometric centroid source offset	$2.99 \pm 0.19$	15.72	$-2.93 \pm 0.19$	$0.62 \pm 0.09$

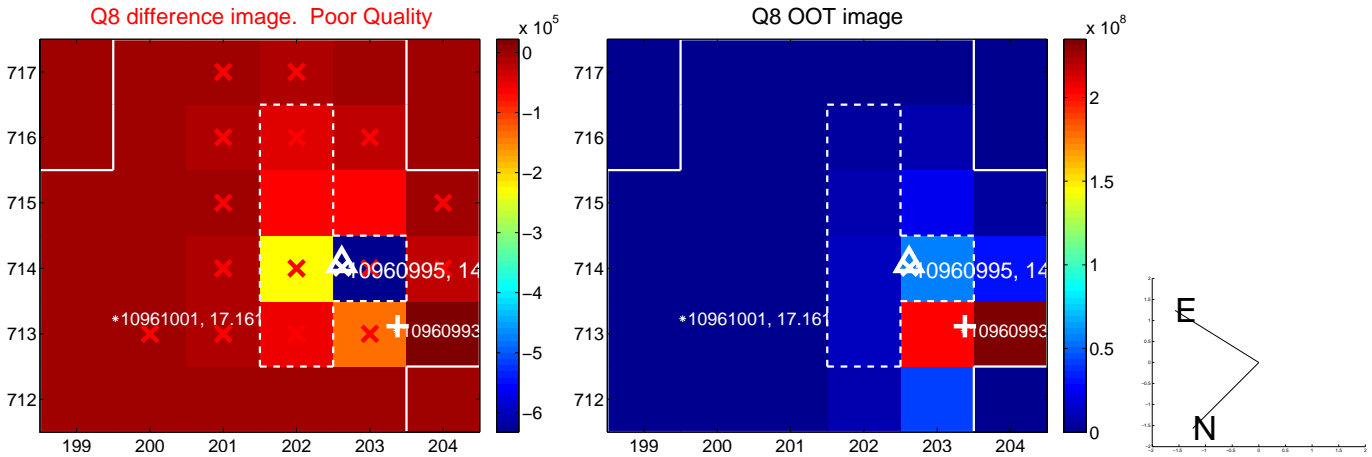
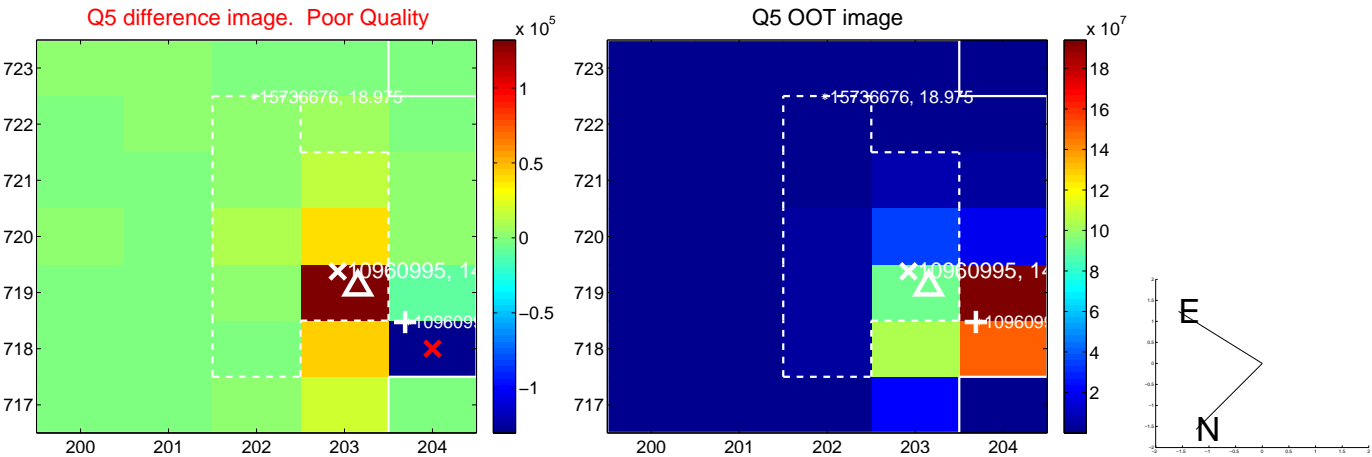


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

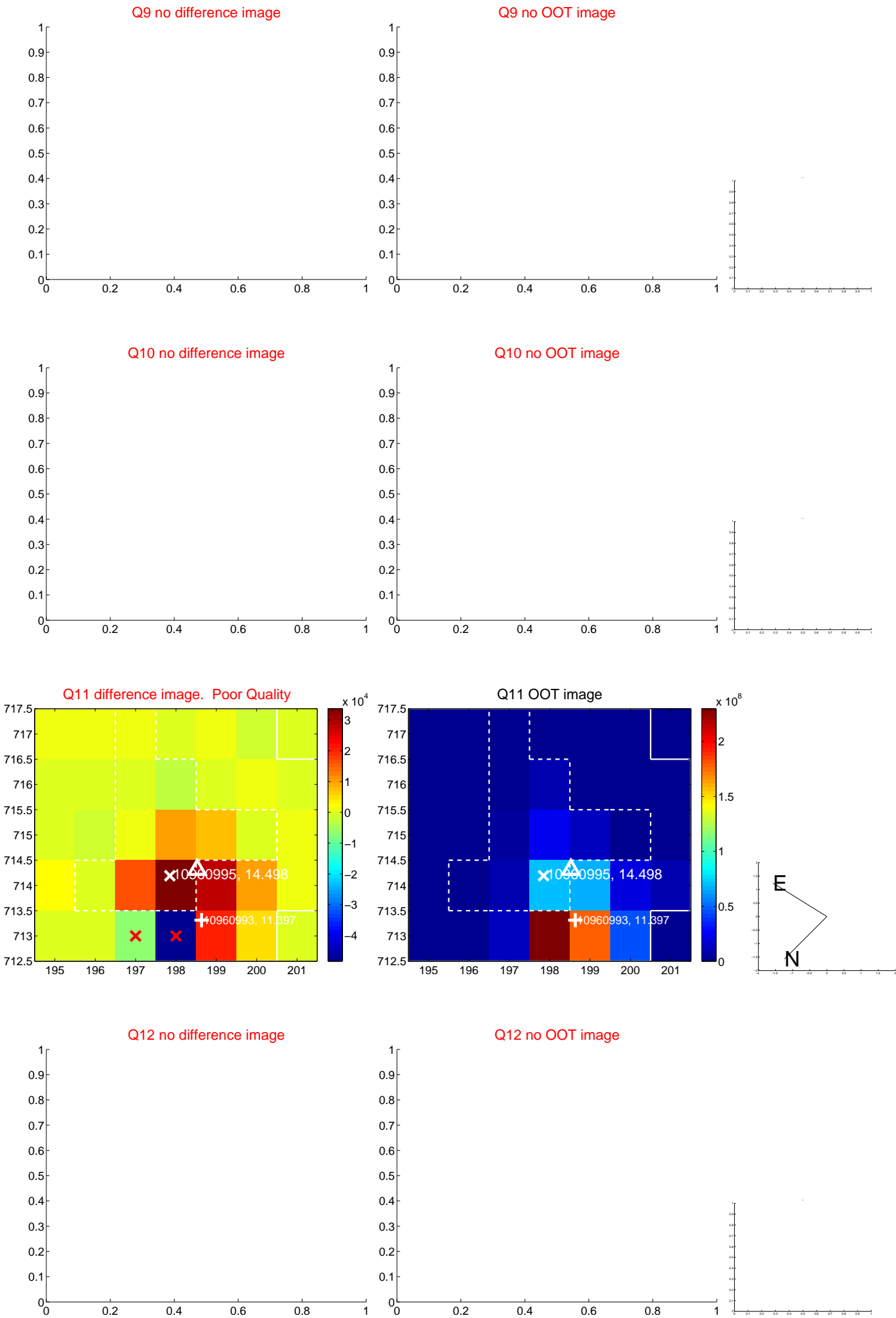
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



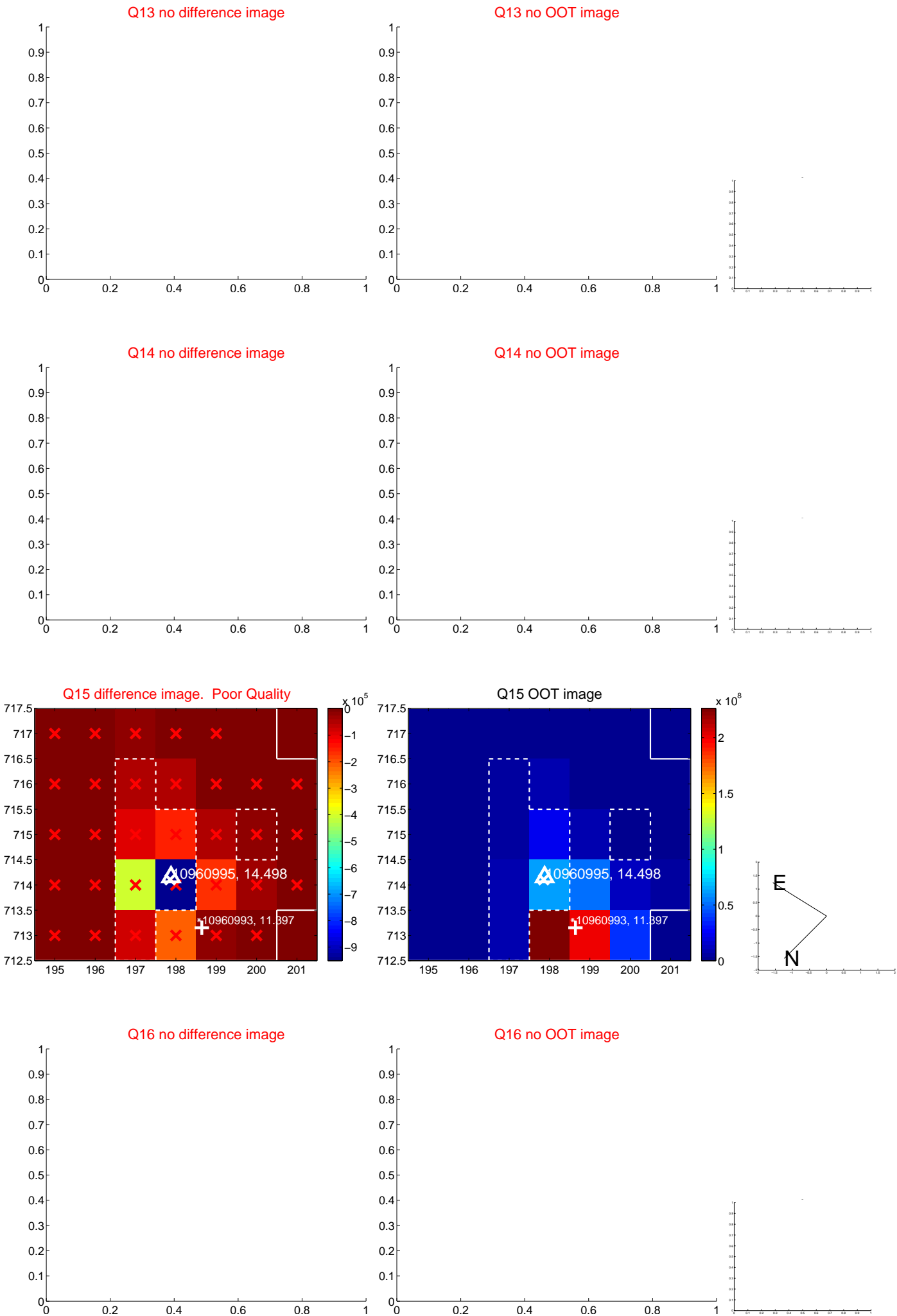
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



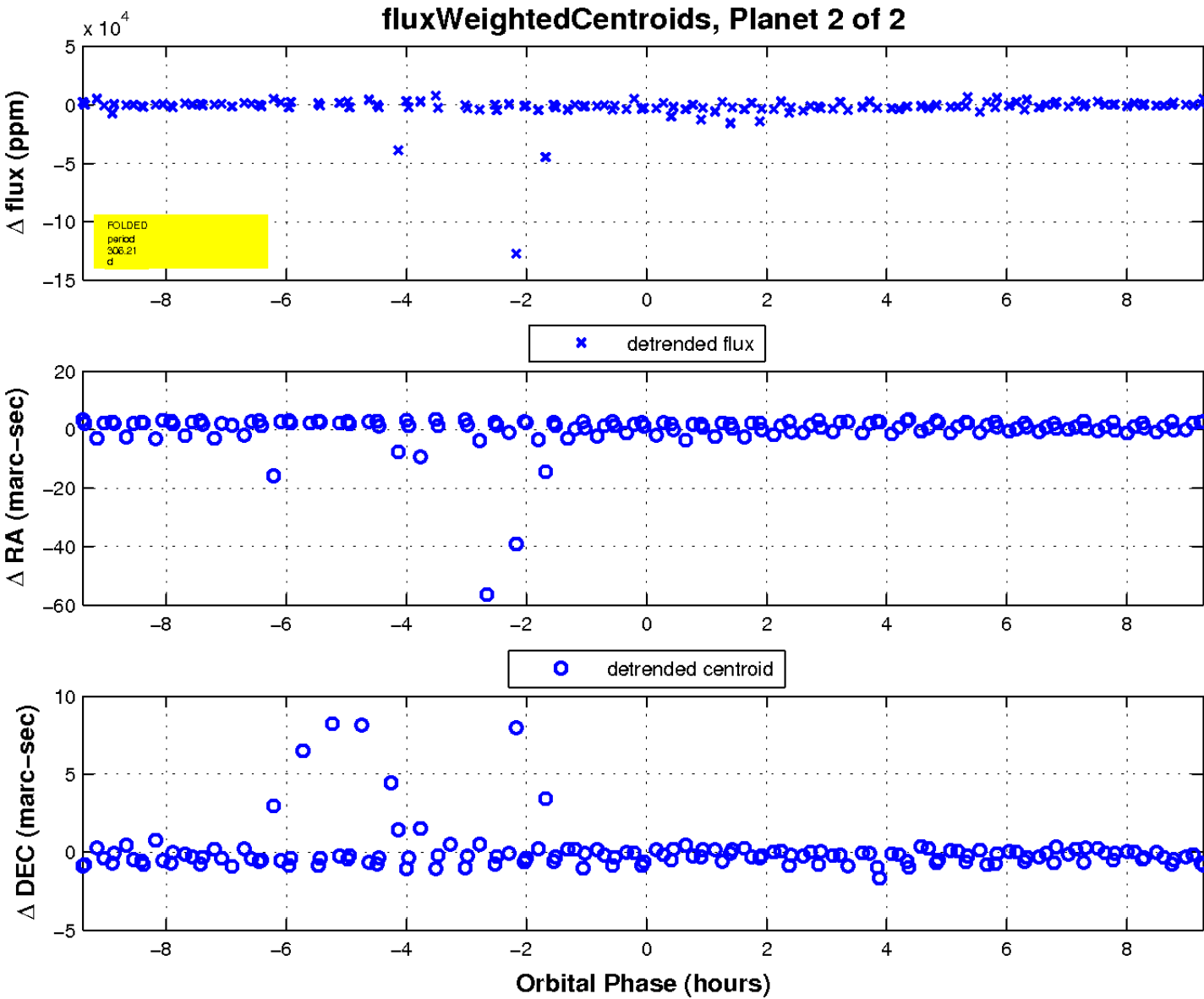
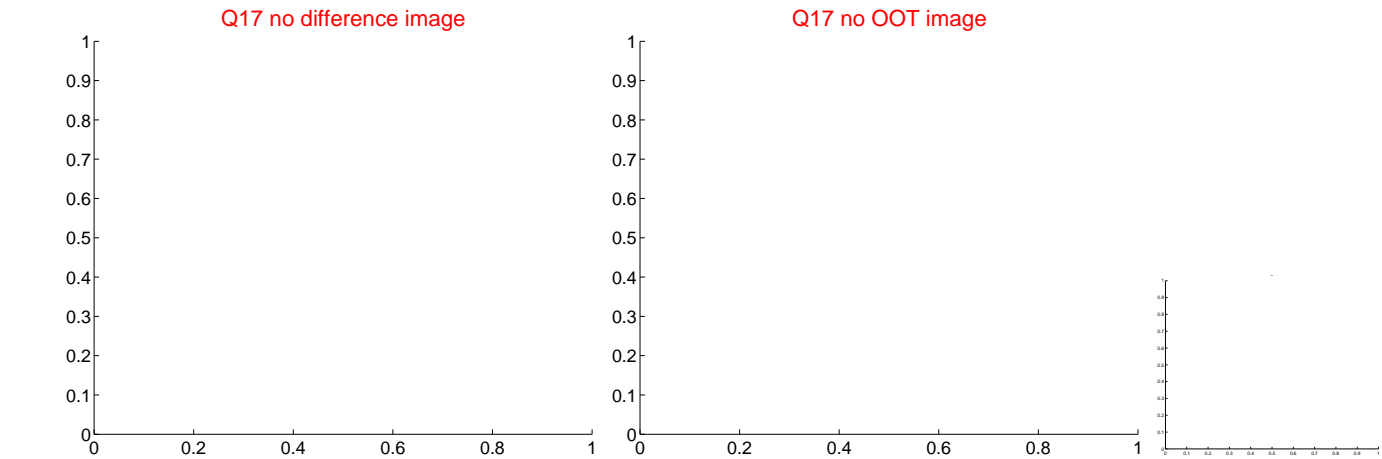
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

